

PERSONAL COMPUTER weekly NEWS

MAY 26 • 1984 • No 62 50p

DRAGON IN BUSINESS
Put a mini in your micro
with the OS9

SPECTRUM SOUND
Make music with
machine code routines



ART ON THE 64
A new graphics pad
shows its colours

SOFT HOTLINE
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new products

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carry off IBM
compatibility?**



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Business Computers

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Cover photograph: Howard Kingnorth

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It has been a long wait, but finally the Compaq has arrived. In its sturdy casing this luggable micro could cause a stir in the business sector. As Richard King discovered it is eminently IBM-compatible.

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J Williams devised this utility to sort arrays on the Spectrum.

QL fails first test

By John Lettice and Kenn Garroch

The elusive QL has finally found its way to a few lucky customers. But the machine that is currently going out is a distinctly unfinished product. The famous dangle is attached but that is unfortunately the last of your problems.

The dangle, you'll recall, was fitted after it was decided that the QL's SuperBasic couldn't be fitted inside 32K, and will be removed once the main board has been redesigned to accommodate it. Theoretically this should mean that the whole of the Basic as initially specified would be operational on the machines now going out—but it isn't.

The QL is ludicrously easy to crash from Basic (try using an array without dimensioning it) and the editor is primitive. As users receive the machines it seems that a major bug hunt is under way. The Microdrive syntax is bizarre (although this must have been deliberate) and

access times are upwards of a minute.

The drives on the QL we saw were clearly malfunctioning, and took, nearly five minutes to fail to load the QL.

The keyboard also belies the QL's image as a business machine. The key tops are expensive, classy items, but underneath there's the same old membrane, and we found them unpleasant and difficult to use. For an extra £30 or so the machine could have had proper switched keys.

Sinclair doesn't accept that there are major problems with the Basic. A spokesman told PCN that a screen editor would be added, and that the Basic was going through 'final checking'. It isn't clear whether or not this will include a radical bug-fix.

As far as the drives are concerned, Sinclair admits that the long access times will be improved on later models. It's not clear why a

system that works well on the Spectrum works poorly on the QL.

The fix will still be a long time coming. There isn't a definite date for the arrival of the redesigned circuit board, but two or three months seems the earliest date likely. The fix is still likely to involve sending back your machine, so business customers would be foolish to put their files on the QL now.

How could it happen that British industry's blue-eyed company could foul up so badly? Managing director Nigel Searle explains that Sinclair felt customers would rather have a provisional machine than no machine, but this doesn't explain why it was launched early in the first place.

Sinclair says that at the time of launch it felt the problems remaining could be fixed in fairly short order. The company was clearly wrong, and the QL has already become the star of an Advertising Standards Authority case (see p 3).

GST ready to take up slack

GST Computer Systems wants to offer an improved operating system for the Sinclair QL.

It will be 'somewhat more concurrent' and offer better windowing facilities than the existing native Sinclair Q-DOS, the company says.

The new OS, 68K/OS, claims as its strengths the ability to run a multitasked operating system, multiple screen windows using a bit-mapped colour screen, a new Microdrive filing system, a device independent input/output subsystem, a menu and form-handling package and a choice of command or menu-driven shell programs.

The operating system will begin life as the heart of the GST's 'wholesale' version of the QL.

'We may yet offer this as an alternative OS to the QL,' said Chris Scheybeler, of GST. 'If the market is unhappy with the OS they get, then perhaps our system would fit the bill.'

He stressed, however, that using the GST operating system would not be cheap. The Psion applications packages bundled with the QL will not work under GST's 68K/OS — and any software that would run under 68K/OS would have to be purchased in addition to the operating system.

The GST board system — GST has yet to finalise the price of the unit — will allow the development of specialised 'QLs' for computer-aided design, terminal emulation, data acquisition and point-of-sale calculations.

Meanwhile, QL software suppliers are springing up. An early example is called Olevier Qlogs.

Future net



Line ahead: Future's network.

Future Technology Systems, the British company that promises you more than you can get from IBM, has scored a major point against the Big Blue.

Not only has it specified the cabling for its own local area

network but can also deliver interface boards and software to get the network up and running. IBM can only offer cabling so far.

Future's V-Net transmits data at one Mbit/sec and uses Concurrent CP/M and DR Net as its software. The interface card has its own 5MHz Z80 processor and 32K of RAM to hold the networking software.

V-Net can support up to 32 nodes — either individual micros or multi-user systems. A gateway node to allow access to Ethernet is under development. The cost of the network will be below £500 per node.

MSX static



The MSX line-up — as far away as ever.

The MSX standard hit the UK last week — but hardware, software and peripherals are lagging behind. The Japanese companies subscribing to the MSX Z80 standard shipped in from Japan Jay Nishi, the Microsoft guru who started it all off, to help launch MSX.

The idea of MSX is that manufacturers can produce machines based

around the Z80A processor and Microsoft's MSX Basic. These will use the same software and the same peripherals, so the manufacturers can ensure each machine has a large base of software and add-ons from the word go.

The price of this is that the hardware could be seen as a little antiquated, but as Microsoft's

IBM pares software cost to the bone

Drastic software pricing from IBM should set the cat among the pigeons, at least in America.

IBM has just announced a complete portfolio of PC business applications packages at less than \$150 per module. All but two are IBM-developed; the others are revised versions of PFS:FILE and PFS:Report.

The most important package is probably IBM Personal Computer Writing Assistant which includes a spelling checker. A Graphing Assistant can be used with data prepared with the Filing and Reporting Assistants.

The major package, Planning Assistant, won't be available until January, but first reports claim it makes packages like Multiplan and Visicalc look 'second rate'.

Existing owners of the PFS programs will be able to upgrade for \$45 and other packages include a complete accounting system for small business for \$80; a \$60 cheque account and stock portfolio package; and 'Home Solutions' which covers filing of addresses, home finance and so on.

The move follows the company's hardware price cuts and may reflect a move to try to bring software back under IBM control.

IBM has refused to comment on the possibility of the packages appearing in Britain, or any possible UK pricing strategy.

If the software comes to the UK at a \$1=£1 rate it will cause palpitations among native software houses.

David Fraser says: 'There's nothing odd about the Z80 — it's just that it's not new.'

Currently eight Japanese companies are involved — Canon, JVC, Sanyo, Teleton, Hitachi, Mitsubishi, Sony and Toshiba — although undisclosed new subscribers from the UK and Europe are promised.

As far as the meat of the launch was concerned, Alan Kilkenny of the MSX Working Group was most forthcoming: 'The MSX companies will be launching MSX hardware into the UK in the very near future.'

As a payoff, he stressed that the eight machines on show (two of them in a gruesome red) were actually for the Japanese market. 'But some of them will actually be similar to those launched in this country.'

All this leaves us in essentially the same position as we were before the launch. The machines use a Z80A, have 32K ROM and standard peripherals, cartridge slot and software. They will be on sale from the Autumn, and to be competitive will have to be priced around £200 to £300.

ASA slams micro men

The Advertising Standards Authority (ASA) has hit out at 'recklessly misleading' computer advertising in its latest report.

A strongly worded editorial complains that some advertising is of 'at best, an ambiguous and often recklessly misleading nature, at worst, of downright deception.'

In 1983 400 complaints against computer advertising were received, 265 were found worthy of further investigation and 55 were upheld.

The ASA suggests that one of the reasons for the misleading advertising is the rapidly changing technology and its attendant jargon. In one

case a company advertised a 16K RAM pack describing it as '£29 of free software' mistakenly thinking that 'software' described all computer equipment other than the computer itself.

Another reason is that parts of the computer business, especially software publishing, are still at the cottage industry stage with many people setting themselves up in business with little or no expertise in marketing. The report cites one instance of a 17-year-old who advertised programs he had written and was unable to meet the demand his adverts generated.

But the ASA's major criticism is

not against the inexperienced or those lacking technical knowledge. It roundly condemns mail-order companies that take money from the public but fail to deliver the goods. 'To be blunt,' the report says, 'some of them advertise their product before the product exists.'

● No less than nine complaints against computer companies were upheld by the ASA in its latest report. Heading the list was Sinclair.

Sinclair, with two previous complaints upheld in the last year, was criticised over the delays in delivering the QL. The ASA concluded that Sinclair's initial production targets were not high enough to

warrant the advertising campaign.

Sinclair was also criticised for claiming that software was available on the Spectrum for playing chess 'to grand master standards'.

Other companies in the firing line were Computer Discount Centre, Computerland, DK Tronics, Dixons, Interleaf, Lowe Computers and Softsel.

The ASA has issued warnings to publishers not to carry advertising from Computer Discount Centre as well as Anco Software, Boom Software and Odyssey Computing. Complaints had been made against all four companies but they had failed to respond to enquiries.



STOP THIEF — Now that Apple has announced the Apple IIc you will no longer need to carry around your Apple IIe. To make the IIc truly unportable Iamac (09285-67551) has brought out this £39 worth of kit that adds a whole new meaning to the word 'add-on'. It's a two-part pick-proof

security lock. One part is bonded to the bottom of your micro using 'the super tough adhesive supplied'. The other part is bonded or screwed to your desk. So now if some light-fingered person wants to walk off with your micro they will have to take the desk into the bargain.

Protek modem held up by Telecom approval process

By Kenn Garrock

Your mouth may have been watering at Protek's advert for its new modem at £59.95.

But Protek now says there's going to be a delay. It is waiting for British Telecom approval for the system; approval has apparently been delayed by BT for a month, putting back the release date to the end of July.

The modem will be completely RS232 compatible, though to run it some of the smaller machines will need an interface, cable and some software. These will be available as

separate packages priced between £9.95 and £24.95 depending on the requirements of the particular machine. Protek will be producing interfaces for the Electron, Spectrum and Oric plus special adaptor cables for the Vic 20 and Commodore 64.

The software will be menu driven and will allow connection to Micronet and Telecom Gold. There will also be options available for computer to computer communications including memory and program transfer, as well as simply typing messages down the phone line.

DEC display

There were hints of how the other half lives at the DEC User Show in west London last week. Unfortunately for the organiser, the other half is thin on the ground in these straitened times.

Digital Equipment (DEC) is justly famous for its minicomputers and in this area it attracts DEC-compatible suppliers, as IBM does at all levels. But DEC's flagship micro, the Rainbow 100 (now joined by the Rainbow 100+) has not made a great impact and this was reflected at the show.

Only about ten per cent of the exhibitors dealt with Rainbows and a number of these were shameless enough to find room on their stands for IBM PCs or PC clones. Even so, they gamely entered into the spirit of the show by demonstrating products not previously seen and by revealing plans.

These were exclusively business-oriented; Dungeons and Dragons was originally written on a DEC system but times are more serious now. Jensen accordingly launched a word processor, Facts added to its business range, and Data Transla-

tion presented a CAD/CAM system.

Jensen's WPS-80 runs on the DECmate II as well as the Rainbow. Perhaps its greatest attraction to users will be the module it includes to support non-DEC printers. It also has a calculator mode and 132 character displays. It costs £338.

Facts Software's suite of accounting packages, known as Microfacts, has been expanded by two systems covering Payroll and Order Processing. The modules cost £300. Facts may be more familiar to you in the Commodore context but don't be deceived — Microfacts isn't simply a conversion but a complete rewrite for the DEC system.

Data Translation's Cadplan, for the Sirius and IBM as well as DEC micros, is a product that has been developed by builders and users of large-scale systems. Delfont Computing also had a software product with its roots in the big systems league — RIMS/MPG, the Level II Cobol program generator developed by ISR of Pittsburgh. The micro version of this package is due



Rainbow: DEC's late riser trying to catch up.

to be launched in the UK fully in July, and Delfont expects to start selling it in September. It produces code to the same Cobol spec as Micro Focus' MicroCobol, and Delfont will be concentrating on the IBM PC as a vehicle for RIMS/MPG. The price is likely to be about £899.

Approaching DEC from the other side, Personal Computers Ltd was demonstrating a Compaq Via Crosstalk it had the portable IBM-

compatible machine hooked up to a DEC Vax supermini, and director Alan Brown was proposing it as a portable terminal.

For Rainbows users who didn't make it to the Hammersmith show, the DEC User Group Decus wishes it to be known that a PC Special Interest Group is being formed within Decus. Membership is free but next year it may cost £15. Contact Ray Woodyear at DEC on 0734 853726.

VIEW FROM JAPAN



Commando raid recovers Apricot

By Serge Powell

This is sub-titled *A Tale of two Technologies*. It was neither the best of times, nor the worst of times; it was the day that I visited the first owner of an ACT Apricot in Japan.

There in his driveway lay the wreckage of a former glory of British technology, a 1974 Norton Commando 850 brought to Japan at great expense and now stricken, its front forks twisted and the tyre ripped from the mangled wheel. Grimacing through the pain of his broken collar-bone the owner of both bike and machine (referred to as Mr X in the interests of confidentiality) catalogued the rest of the damaged parts.

The newly installed touring tank was now visibly destined for the scrap heap while the immaculately chromed muffler looked as though it had just come from there. Hardly a nut had escaped unscathed. But the spirits of its one-time rider soared as he turned to his new pride and joy and booted home his two-day old Apricot—a sign, perhaps, of Britain's renaissance in technical skills.

Mr X began to explain how in addition to word processing he'd construct a database of all the Norton parts dealers in the US and Britain and all the parts they had in stock. We all get into computers for one reason or another, I suppose.

But why an Apricot, and why the only one in Japan? The closest service station for this kind of machine is in Hong Kong. Surely somebody who has been through it all with a Norton would know better than to take it on again with a micro?

It seems that Mr X, and his friend who owns the only Sirius in Japan, have a further friend at Swire Pacific, the official distributor for the machines in Asia.

Yet another friend, returning from a business trip to the Peoples' Republic of China, was willing to pick up the Apricot while making a connection for Tokyo if Swire could be persuaded to deliver the computer to the airport.

But first Mr X had to be persuaded of the wisdom of the investment. For reasons I acknowledge but don't understand, he was. Partly it was just like that time ten years ago, when he liked what he read and heard about the Norton—in the case of the Apricot it was very encouraging. Of the high-resolution screen he said there was none finer. The other aspects of the specifications impressed him equally, and as a frequent traveller I must admit the transportability stirred up traces of jealousy, especially as the local manufacturers have yet to show anything nearly as powerful.

I also agreed that, next to the Mac, it is the prettiest computer I've ever seen. Furthermore, his experience of computers to date is of a Wang word processor so he was hardly going to be content with an 8-bit clunker like mine. In fact he told me that he'd never even considered a Japanese computer.

To my mind the WordStar he's using isn't sufficiently fast to make the added expense worth while. And if there are worse positions on a keyboard for the control key, I've yet to see them.

Then he let slip the factor that, in the end, propelled him towards the Apricot. The friend-with-the-Sirius had done a selling job, coupled with an astute piece of psychology. Unless you're a brilliant engineer or programmer, the argument runs, the days of pioneering and adventure in personal computers are gone. Hardware and software are getting friendlier and friendlier and we all seem to be getting into supportive user groups.

As the man with the Sirius described it: 'Those who opt for the easy route are the clingers. Those who opt for the only one of its kind in the country are the adventurers.'

And that, I suppose, is why there is an Apricot in Japan, and some day perhaps it will be the first in the world with a chrome keyboard, pin-striped CPU, and mag wheels on the monitor, because should anything go wrong with it that's all it will be good for.

AMS ties in with Replica

Common sense seems to have triumphed at Advanced Memory Systems (AMS), which is offering its 3in disk drives for the BBC with a utility that enables you to copy tape software onto the disk.

The utility is Replica from Clares of Winsford. AMS won't encourage piracy because Replica can't be copied, and users can make only one copy of each applications program.

This is a sensitive subject and Acornsoft is believed to be still negotiating with Clares, several months after Acorn served an injunction on a computer magazine for printing a utility that allows

software to be transferred from tape to disk.

Replica normally costs £15 on a 3in disk. AMS is asking £199 for a package of disk drive and software. The Hitachi unit it sells is double-sided; for the price you get a formatting disk with the formatting routines on one side and Replica on the other. Cables and an 80-page manual are also included.

Nick Pearson, AMS' marketing director, said: 'For some time people have been buying our drives but have been frustrated because they have been unable to load and run successfully many of the expensive games they have on tape.'

Registration deal for PC

Software piracy? Some companies are approaching the problem on a novel tack.

CGCS has just released its IBM-PC communications package 'A121'. For just £9.50 you get a distribution disk which 'may be freely copied and shared by individuals for their own use or to share with others'. The catch? Well, there

isn't one though you may not alter the program or the on-disk documentation, and if you want support from the company the registration fee is £29.50.

While CGCS isn't encouraging copying, it hopes users will come back to the company for more products and that copying will work as free advertising.

Registration is not necessary, though if you do have interference problems CGCS won't help unregistered users.

Contact Peter Goldmann on 01-399 8530 for further details.



STACKING PATTERN—R should soon be easier to lay your hands on a Stack lift rifle or indeed any other Stack add-on. The company is extending its range and will be selling through high street stores and computer shops. The company says R has been 'inundated' with requests from UK and overseas manufacturers for new products. So keep a sharp look out.

Kaypro enhances model 4

Kaypro Europe has announced the Kaypro 4 (84)—a slight update of the standard Kaypro 4.

Enhancements, when the machine eventually arrives in the UK in September, will include improved resolution, 392K Thin-line drives and full and half character intensity.

It's fair to say that Kaypro has fared better in the US where it found a slot in the Osborne-type luggable market. The machines

were based on the Osborne formula—Z80 processor with bundled standard applications software, packaged in portable sewing machine manner.

Kaypro, however, developed its product with a variety of models (including built-in 10MB Winchester) and upgrades (16-bit 8088 processor board).

The price of the Kaypro 4 (84) is expected to remain the same as the standard 4, £1,595 plus VAT.

Games cheaper

An attractive £2 is emerging as the rock-bottom cost for games as more suppliers cut their prices.

In the wake of Mastertron and Pulsnic (Issue 57), two new companies, Advanced Computer Entertainment and Atlantis Software, have entered the cut-price games market with programs costing £2.99 and £1.99 respectively.

Initially ACE software was £6.90 but prices fell to £2.99 in April. 'Our sales went up ten times,' said Mickey

Shepherd, a director of Ace.

The company is already involved in distributing low-cost video tapes.

'We looked at the games software market last year and felt there were a lot of products but few outlets. We also felt that games would come down to a more acceptable price level this year,' said Mr Shepherd.

ACE sells its games, currently ten titles mainly for the Commodore 64, at half the price of its competitors' games.

'It's the only way to combat copying,' said Mr Shepherd, 'Counterfeiters won't be able to make any money out of it.'

Meanwhile, Mastertron says it has sold over a quarter of a million tapes since launching its £1.99 games.

It now has 27 titles with another four on the way. It is also bringing out games for the BBC in addition to Dragon, Spectrum and Commodore 64.

Casio breaks £400 barrier on luggage

And now, all the computing power you'll ever need in your briefcase. The Casio FP200 mainframe is a compact 310 x 220 x 55.5mm unit, burles Casio's confused press announcement. Once you've recovered from your initial disportment, however, this A4 portable looks interesting.

It's priced at £345 plus VAT, has a full qwerty typewriter-style keyboard, a built-in spreadsheet, RS232C and Centronics ports. It will also support word processing, and its Casio Easy Table Language (CETL), which uses only its fundamental commands to handle data editing, processing and input/output is compatible with Basic, while the machine itself supports an extended Basic.

The screen is only eight lines by 20 characters of LCD, and the basic model has only 8K of RAM, but this can be expanded in 8K stages up to 32K, while the 32K ROM can be expanded to 40K.

Its CPU is the increasingly popular 80C85.

Casio is still struggling to break free from the pocket-calculator image that dogs it. Claiming to have produced a 3lb mainframe won't inspire confidence but the FP should advance its desire to be taken seriously as a personal computer supplier.

For more information contact Casio on 01-450 9131.



RISE BURROUGHS—Burroughs has joined the other mainframe makers with a PC in their catalogues, but its B25 launched last week aims higher than stand-alone desk-top processing. The B25 will typically be a workstation in clusters of six to 32. A unit with 256K and twin floppies will cost £3,200, and deliveries will begin next month. It supports MSDOS, CP/M-85 and BOS besides the supervisory Burroughs operating system B705 which ensures compatibility with other Burroughs products, including the XE520 shared resource processor. Burroughs is on 01-750 1291.

Prestel DBs rejigged

Prestel has reorganised the Micronet, Viewfax, Clubnet and other micro databases as a prelude to launching new services.

All the databases have been brought under the Prestel Micro-computer banner so Micronet subscribers are welcomed by a new front page when they log-on.

This is something of an irony as Viewfax was the first micro database on Prestel but was overshadowed by all the publicity that has surrounded Micronet.

New services planned by Prestel include School Link—a dedicated database for secondary schools, Head Start—a home education database, and Executive Micronet, which sounds suspiciously like the promised Business Prestel that was due to start last autumn.

PERIPHERALS

The new releases



Integrex Colourjet 132: feel the width.

Printers/plotters

Full width printing and plotting is the promise of Integrex' Colourjet 132, with seven colours in its normal 80-column mode but a compression option to give you 132 columns. The Centronics interface is standard, and buffered RS232 options are available. The unit costs £550 plus VAT. HAL Computers (0252 517175) has launched the Sweet-P Model 100 for £498. The workhorse of dot-matrix printing has acquired an elegant big brother in the Epson stable—the Japanese company has launched the RX-100, a printer with a 15in carriage and a print rate of 100 cps. If you can't stand the noise it

prints more quietly at 50 cps. The price is £517. As an enhancement for the Oki Microline 82A and 83A printers X-Data (0753 72331) has released the OK-Writer module. This is a plug-in unit which, X-Data says, improves the print quality, adds bold-face print and underlining, pin-addressable graphics, and 'half-dot-addressable' graphics at 240 dots/in. If anything goes wrong it also features a self-diagnostic routine. The price is £99.



Epson RX-100: dual carriageway.

Storage

Kaypro, better known for its portable micros, has started production of a 2.7Mb 5¼in floppy drive called the DriveTec 320.



Opus: double-sided microdrive.

The track-to-track access time is less than three milliseconds and the data transfer rate 500K/sec. The unit will appear in future Kaypro systems. Closer to home Opus (01-638 1698) has released what it claims is the UK's first double-sided 3in drive *ie* one which doesn't have to be taken out and flipped over. A 200K single unit costs £229.95, a 400K unit £459.

IBM back-up

Removable cartridge systems have shown remarkable resilience since PCN pronounced them dead in a moment of absent-mindedness last year. Now APS Microsystems (0273

420195) is offering the Alpha 10 and the Beta 5—perversely with 20Mb and 10Mb respectively. When you exhaust one Winchester, you simply add another. Alloy (0285 68709) has enhanced the PC-Backup cartridge tape drive by increasing its data rates; transfer potential is up to 25 per cent to 1.4Mb/min. The capacity of the unit is 16.5Mb. It costs £1,750.



PC-Backup: enhanced data rates.

PCN CHARTS

GAMES



COMMODORE 64



	GAME TITLE	PUBLISHER	MACHINE	PRICE
▲ 1	Jet Set Willy	Software Projects	SP	£5.95
▲ 2	19 Space Pilot	Anirog	64	£7.95
▲ 3	3 Fighter Pilot	Digital Integration	SP	£7.95
▲ 4	8 Atic Atac	Ultimate	SP	£5.50
▲ 5	4 Manic Miner	Soft Projects/Bug-Byte	SP,64	£5.95
▲ 6	9 Hunchback	Ocean	SP,64	£6.90
▲ 7	12 Night Gunner	Digital Integration	SP	£7.95
▲ 8	30 Code Name Mat	Micromega	SP	£6.95
▲ 9	2 Chequered Flag	Psion	SP	£6.95
▲ 10	6 Fred	Quicksilva	SP	£5.90
▲ 11	11 BlueThunder	Richard Wilcox	SP	£5.95
▲ 12	5 Ant Attack	Quicksilva	SP	£6.95
▲ 13	13 Bugaboo (The Flea)	Quicksilva	SP,64	£7.95
▲ 14	22 Scuba Dive	Durell/Martech	SP,64,OR	£6.95
▲ 15	27 Trashman	New Generation	SP	£5.95
▲ 16	— Flight Path 737	Anirog	64	£7.95
▲ 17	15 Rev of MCs	Llamasoft	64	£5.95
▲ 18	28 Pilot 64	Ahex	64	£7.50
▲ 19	24 Snooker	Visions	SP,64,AC,OR	£8.95
▲ 20	18 Blagger	Aligata	64	£7.95
▲ 21	20 Pogo	Ocean	SP	£5.90
▲ 22	26 Twin Kingdom Valley	Bug Byte	64,AC	£9.50
▲ 23	21 Forbidden Forest	Cosmi	64	£8.95
▲ 24	— The Boss	Peaksoft	64	£6.95
▲ 25	— Alchemist	Imagine	SP	£5.50
▲ 26	7 Chinese Juggler	Ocean	SP,64	£6.90
▲ 27	14 Wheelie	Microsphere	SP	£5.95
▲ 28	— Killer Watt	Aligata	64	£7.95
▲ 29	29 Android II	Vortex	SP	£5.95
▲ 30	23 Super Pipeline	Taskset	64	£6.90

MICROS

Top Ten over £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR
▲ 1	4	Apple III	£2,280	AP
▼ 2	1	IBM PC/XT	£2,390	IBM
▼ 3	2	ACT Sirius	£2,525	ACT
▼ 4	3	ACT Apricot	£1,760	ACT
▶ 5	5	Wang Professional	£3,076	WANG
▲ 6	—	Kaypro	£2,595	CKC
▲ 7	8	Olivetti M20	£2,180	OL
▲ 8	9	Televideo TS1603	£2,640	TH
▼ 9	6	DEC Rainbow 100	£2,359	DEC
▼ 10	7	NCR Decision Mate V	£1,984	NCR

Top Ten up to £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR
▶ 1	1	CBM 64	£199	CBM
▶ 2	2	Spectrum	£99	SI
▶ 3	3	BBC B	£399	AC
▲ 4	7	Electron	£199	AC
▼ 5	4	Vic 20	£140	CBM
▲ 6	8	MTX 500	£275	MTX
▲ 7	—	Oric Atmos	£175	OR
▼ 8	6	Dragon 32	£175	DD
▶ 9	9	ZX81	£40	SI
▶ 10	10	Atari 600XL	£150	AT

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the fortnight up to **May 17th**. The games chart is updated every other week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.

PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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SPECTRUM	All tapes originals-not pirates.	
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French Fun	CDS ... £5.80	Space Pilot
Ant Attack	OS ... £5.90	ANIR
Frenzy	OS ... £4.80	ORIC/ATMOS
Fred	OS ... £5.90	ATMOS 48K Computer
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Jet Pac	ULT... £5.00	Oric Base
Lunar Jetman	ULT... £5.00	Oric Calc
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Minimar	INC ... £5.00	Special offer.
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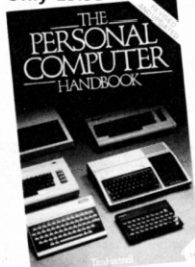
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The manufacturers' naming game

Having entered the PCN Lynx competition (Issues 56), I'd like to explain why a good name is important to the sale of a new computer.

Most people look for a computer whose name they are proud of. When asked what make of computer you have, it would be silly to answer 'I've got an Orange computer' or 'I have got a Plan'.

I recall three years ago when I was looking for a computer to buy. I came across one called ZX80. Well, the name struck me and it sounds fantastic. I went to buy a ZX80.

After a few months of hard analysing I realised that the computer was useless for me. I could not do anything with it. I was so disgusted with the computer I threw it into the river.

This shows that the first instinct of any computer buyer will be the name, and with 96K I should think the Lynx should do well.

David Tan
Richmond, Surrey

But is the second instinct necessarily so fatal? — Ed.

Acorn — could try harder

It is about two-and-a-half years since the BBC computer was launched, and looking at the official Acorn hardware available, I am not impressed.

For instance, I thought Acorn was releasing its own ROM extension board? Will it be about twice the price of its competitors and do less, and will Acorn then declare other firms' products 'incompatible'? Of course not, Acorn cares about its customers.

If Acorn cannot find the time to develop its own BBC add-ons (being too busy flogging the BBC to the Americans, perhaps), why can't the firm endorse other companies' products, eg Computer Concepts' impressive extension graphics ROM?

Also, you would think (wouldn't you?), that Acorn would be keen to keep the price of peripherals down to make the system look a better

PCN £10 Star Letter



buy, especially considering the price of the computer in the first place. As an example, you can pay £60 over the odds for an 'official' disk drive.

I could go on about speech synthesisers, DFS chips, tape recorders, second processors etc, etc, but instead I'll just mention the

RANDOM



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BBC joysticks (no, don't laugh). These are about the cheapest on the market and they're fully proportional. So why aren't they self-centring versions and why the awful case (are they really surplus hi-fi cabinets)?

The BBC could be the Apple II of the future — its support making it a good buy — but Acorn may miss the boat, if people start thinking that the 6502 is a bit old-fashioned; perhaps they should buy a (cheaper) 68000-based system?

I, for one, don't want to be left with an obsolete computer, so come on Acorn, less promises and more products. Affordable ones would be nice, too.

J A Empson,
Hemel Hempstead, Herts

I'm sure, though, there's no truth in the outlandish suggestion that Acorn has just bought Torch to obtain it's second processor. That would be a touch too cynical — Ed.

Help to design a computer desk

As part of my A-level design course I am designing a computer desk/work unit with the home user in mind. I am investigating what form these units should adopt, whether it be an expandable system or a solid single unit.

I want to know what readers would want from a computer desk and I have bought my first copy (Issue 42). Obviously, it takes a while for the copies to get to Australia.

I was amazed at the low prices of computers and software in the UK and have written to various software houses. I was also amazed to read PCN Billboard and see the equipment being sold second-hand. I rang all the sellers but they had sold their equipment months ago.

I want to buy a second-hand Spectrum 48K and will pay £10 more than the best price you have had. Any software or extras are also sought. If anyone can help please

Calling all bulletin boards

I'm writing a book called The On-line Handbook which will be a complete guide to going on-line with micros. As well as providing information about how to tap into the world's commercial databases, I would also like to offer readers a guide to amateur bulletin boards.

If any reader has a bulletin board that is running — even if only for a limited period each week — I will be pleased to include details of number, protocol and information available. Please send details to: Ray Hammond, 70 Greenway Lane, Bath, Avon, UK.
Ray Hammond,
Bath, Avon

When is an Electron not an Electron?

I have, after hours of ravaging encyclopaedias, discovered probably the most significant fact about computers and computing: The definition of the Electron.

The Electron was first used in 1980 in the USA. It is now being used again. It is simply a banner which attempts to persuade or persuade the American public to vote Republican and its candidate for Presidency — yes, Ronald Reagan.

So now, the definition of the Electron has been exposed exclusively for PCN, and we can now all, once more, sleep peacefully.
Anon (American) Voter
Chorleywood, Herts

Spectrum wanted — in W Australia

PCN has recently become available in Perth, Western Australia, and I have bought my first copy (Issue 42). Obviously, it takes a while for the copies to get to Australia.

I was amazed at the low prices of computers and software in the UK and have written to various software houses. I was also amazed to read PCN Billboard and see the equipment being sold second-hand. I rang all the sellers but they had sold their equipment months ago.

I want to buy a second-hand Spectrum 48K and will pay £10 more than the best price you have had. Any software or extras are also sought. If anyone can help please

reply by airmail to:
Wayne Smith, 24 Wyatt Road, Bayswater, WA 6053 Australia, or phone before 2pm British time on 010619 272 8545 (cost is approx £1 a minute).

Also, the first company to offer mail order to Australia will make a killing.
W K Smith,
W Australia

This must constitute gazumping — but he does sound desperate — Ed.

User group for various machines

For several years micro users have had to belong to the user group for their particular computer. Exceptions have been the users of Forth, Pascal and other special languages for whom user groups existed.

With the growing use of Basicode and the interest the radio transmissions are generating, surely the time has come for a user group where users of different makes of computers can correspond and interchange programs through the use of this versatile Basic translator.

If anyone would be interested in forming such a group, I would be prepared to assist in its creation. Interested readers should write to me outlining what they would expect from such a group. Then, depending on the response, action could be taken towards setting up a Basicode Users' Group.

W Kent,
90 Main Street, Newton, Derby

Barking up the wrong piracy tree

I have sat week after week refusing to be drawn.

I have smiled at the gullibility of the great British public. I have listened to the whines of the software houses. But enough is very much enough.

Software houses lock their programs because no way do they want people to see the miserable level of bit twiddling that goes on inside them. And that is the only reason. All this horse-feathers about copyright protection is so that their rapacious appetites for money will never be questioned.

The sort of people who cause the software houses the greatest grief do not own a computer. They do not need a computer, and most of them wouldn't know a computer if one fell on their heads. They do not break into locked programs because they never load a program into a computer.

What incenses me is that the software houses know this. They have always known it.

I used to know a software pirate. He had three high speed duplicators, and two Telex tape duplicators. He could churn out 12 games copies every 30 seconds, and copy stereo musicassettes in under two minutes. He didn't have to break

anybody's locking system because he never loaded the program into the computer. He merely placed the program cassette into the master position on the fast duplicators, made a few copy masters, then off he went churning out hundreds of copies a day. If the software houses are spending thousands of pounds on locking systems, why is so much money being thrown down the drain?

Due to the nature of magnetic recording it is impossible to stop someone from copying the original, ask the big record companies who have been trying for years for a philosopher's stone to protect their tapes etc. So, with it being so easy for anyone to mass copy computer programs, you really expect me to believe that the computernik who makes a copy of a game (for which he has forked out hard-earned cash) so he can sow a game with a mate is bankrupting the software houses? Again, horse-feathers.

I do not condone copyright piracy, but first you must define your pirate.

There is obviously no black or white in the copyright protection laws, just shades of grey. Stop penalising the people who put the caviar on your chips, and go and get the real pirates.

Kevin M Fox,
North Anston,
Sheffield S31 7DA
S Yorks

Fears of satisfied Oric owner

I am worried whether software houses will continue to support the ill-fated Oric-1.

I am a college student and work with an Apple there. For this reason I bought a computer with a similar operating system and processor. I will eventually get a disk drive but, as most of my money goes towards my academic needs, I shall not be able to afford the upgrade in its present form. I have already suggested a ROM cartridge upgrade to Oric, but got no reply.

I hope the Oric will not just fade out like the Microtan and I think, given the chance, the Atmos could rank among the top few micros under £200 if only software houses put some trust in Oric's new found reliability.

I am pleased with the facilities on my 48K Oric; I find it a pleasure to work with, easy to type on and I have executed every Basic command in the 162-page manual without encountering any of the infamous 'bugs'.

Robert Skinner,
Efford, Plymouth

Spiky problem of mains surge

I wonder if others are having

trouble with domestic appliances interfering with their home computers. I have had a number of total losses due to mains spikes and the like. These at first seemed to originate from the fridge but now the TV has a few victories under its belt.

This is something manufacturers could have taken care of at the design stage. Filtering the mains could easily be incorporated at the production stage.

If a company tried to market say a radio or TV or video that lost its tuning or erased its innards, just because another appliance was used, it wouldn't sell many products, would it? So why should computer owners have to fork out extra for a mains cleaner which, if incorporated in the machine at birth, would doubtless cost less than if bought separately.

I would like to throw down the gauntlet to the manufacturers and invite them to reply to this 'spiky' problem.

Ian Hay,
Eastbourne, E Sussex

Manic Miner elbows the boy

I read recently that a leading software house is to increase production of £15 games. I wonder about the projected market for these considering prices generally. £1.50-£2: 'Grab the pocket money'

market. The money is there but where are the versions of old, familiar games to exploit it? £2-£5: The 'buy an LP on Saturday crowd'. Will the Manic Miner give Boy George the elbow?

£5-£7: The 'I've given up smoking and can stay with these games' market. Is this not the reasonable limit for the price of games?

£7-£10: The 'can I get it for my birthday' crowd.
£10-£15: The 'hope Santa Claus is kind this year' market.

I am amazed at the software house's confidence in pushing the £15 games.

If they stimulate a trend in prices rises then pity help parents and fanatics. I wonder, could the software houses oblige your magazine with the breakdown of the price of a popular game?

Mathew Hisbent,
Kirkcaldy

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Into business with the Spectrum

Q I own and run a small heating company. All of my type copying is done on an Olivetti programmable daisy-wheel typewriter. Recently I purchased a 48K Spectrum for home use only, but now that the Microdrives are becoming more easily available I have decided to upgrade my computer for business use only.

I understand that the Sinclair Interface 1 uses an RS232 interface. Would it be able to use the Olivetti or would a separate printer be necessary?

Also, if I were to upgrade to a business machine, can you suggest the best way to go as far as new keyboards and number of Microdrives needed are concerned?

My last point concerns the Micronet 800 service. Could I advertise my products on this service, and is any business software available on it? Above all, why should I join?

S D Perks,
Essington, South Staffs

A You don't specify the vintage of your Olivetti, but the company's current range of machines takes an RS232 interface, so there shouldn't be any great problem in using the two machines together. Phone British Olivetti on 01-785 6666 to check that your model does in fact have an RS232.

As far as your business system is concerned, we'd suggest three Microdrives would be handy, although you could start off with less. It would be most convenient for you to use your applications programs (Omnicalc, Masterfile and Tasword 2 would be a good start) on one drive and store your files on a second.

The third drive is really a safety measure. Microdrive storage is relatively fast and reliable, but failure generally results in your tape cartridge being thoroughly munched, so it's best to take backups of your files as you produce them.

There are a number of extension keyboards on the market.

The Fuller FDS is relatively good value but the company seems to have been having trouble with the circuit board inside it. This means that some keyboards have shown a lamentable tendency to go berserk, accessing odd keywords and crashing the Spectrum. Fitting Interface 1 inside is also fairly difficult.

The DK Tronics keyboard has apparently been revised so that it will take Interface 1, but we haven't seen one yet. The third possibility is the most expensive — a £70 job from Transform (01-658 6350). This takes Interface 1 easily, and if you're serious about using the Spectrum for business it would be probably your best bet. For the few other keyboards announced, tread warily as some of them might not actually exist yet.

Once you've decided on the bits, you might find it useful to talk to Transform anyway, as the company operates a fairly effective interfacing service. You'll actually find that many of the smaller Spectrum add-on suppliers are happy to advise.

As for Micronet, yes you can advertise, but there's not likely to be much call for central heating supplies among Micronet users, so you'd probably be best sticking to the local papers. You're not likely to get any business software worth having from Micronet (apologies to any budding Ashton Tates who've added their software since we last looked) and it's difficult to nail down exactly why anyone should join. Certainly it's fun tramping round the pages, but its serious applications are still limited. Further information can be had from Micronet on 01-278 3143.

A useful address for Vic 20 interfaces

Q Your article on Protek (*PCN Monitor*, issue 50) didn't mention the address: I want to contact Protek to buy a cassette interface for my Vic 20 as I object to paying £45 to Commodore just for the cassette player.

M J Lunt,
East Herringthorne, Rotherham.

A You can contact Protek on Livingston (0506) 415353. The address is 1A Young

Square, Brucefield Industrial Park, Livingston, West Lothian.

If music be the food of colour . . .

Q I'm having some problems with the graphics for my 48K Oric-1. How is it possible to put different coloured text on the high-resolution screen and how can I get a character that is itself different colours? Is it possible to get continuous music while a program is running?

Finally, is it possible to draw a high-resolution picture while loading the next part of a program?

Bharat Darji,
Leicester.

A Due to the way the Oric uses serial attributes for colour, most of what you want to do is very difficult. When you put a letter on the high-resolution screen, you are really putting a block of 6 by 8 dots on the screen. To make a pixel a certain colour, there must be an INK attribute to its left.

There's no simple way to put attributes on the screen using CHAR, so you would have to POKE the screenbytes immediately to the left of the eight rows which make up the character with the attribute you want. You have to work out exactly where the letter is in terms of the video memory, then subtract 1 from these addresses, then POKE the INK attributes to the screen. INK attributes are less than 8; 0 is black, 1 is red, 2 is green etc.

A similar principle would be involved when you want a character to be composed of different colours. The best you can do here is to have each row of dots of the letter in different INK colours. To do this, just POKE different INK values to the left of each row.

Continuous music can only be done using an interrupt-driven machine code routine. This would load the PARAMS area with the data for each note, send it all off to the sound chip and return to your Basic program. You would have to reset the address pointed to in #229 and #22A to say #400 (POKE #229,1024). This would then divert the Oric to your machine code routine located from address #400 and which ends

with RTS (decimal 60).

It's not easy if you're not familiar with assembly language programming or don't know how the Oric uses the PARAMS area for music, but *PCN* (Issue 31) explained that in detail.

To have a high-resolution picture drawn while another program is loading would require the same interrupt-based idea, so why don't you just CSAVE a HIRRES screen to be loaded before the next program? First draw your picture in HIRRES, then CSAVE "Picture Name", A#A000,E#BFFF. To re-load it, simply replace CSAVE with CLOAD.

Fuller Box hitches loading?

Q Please give me the address for a company that supplies robot arms for the Spectrum. Also could you tell me why a game I've saved on my 48K Spectrum doesn't load now I have a Fuller Box connected? Is it faulty or is it the computer?

Jon Carter,
Frodsham, Cheshire

A Colne Robotics (01-892 8197) produces something called the ArmDroid. This is a large orange beastie with a mechanical grab style claw, and is a snip for £495, or £445 for the kit version. The company also sells an interface to allow you to use it with the Spectrum for £28. These bargain prices, by the way, exclude 15 per cent VAT.

The Colne ArmDroid seems to be fairly tough, but you may be able to find something a shade cheaper. Whatever you get, however, will still be fairly pricey.

Your loading problems could be something to do with the Fuller Box not getting on with the Spectrum. If you can save and load without trouble when the box isn't connected then this is certainly the case. But that wouldn't always mean that the Fuller Box is faulty. Some add-ons do interfere with the operation of the machine, and there's very little you can do.

If only one program is doing this, then it's probably something you're doing within that program. If all your programs won't load, then you've got a good case for getting the Fuller Box changed.

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Copies of Issues 1 to 7 are still available from our Back Issues Department (see order forms on next page). For details of their contents please call the number given.

Issue 8, April 29-May 6.
Pro-Tests: Atari Home Files Manager, Kobra v. Vic Start for the Vic 20, Hectastar's Accounts for the Spectrum, Epson XN80 printer, NC's Decision Maze v. Future Computer's FX30.
Features: Micronet Compact program running on the T199/4A.
Gameplay: Harvester (Vic 20), Strategic Command (Dragon 32), A First Book of Micro Rhythms (BBC), Telling the Time/Money (Spectrum).

Program/Cards: Program Indexer (BBC B), CBM Database cards 1-4, Sort/Extract.
Databases: Software.

Issue 9, May 6-13.
Pro-Tests: Structured Basic on the Apple, Pile Power on the Vic 20, Star DP10 printer, Dams and Intercept interfaces for Commodore 64, Micro-Professor.
Features: BBC function keys, Atari word-processing part 1.
Gameplay: Dungeons of Intrigue (Ori), The Castle (Ori), Starship Command (BBC B), Dragon's Lair, Nowotnik Puzzle (Spectrum).
Program/Cards: Lower case (Dragon 32), CBM database cards 4-6, Monster (Spectrum), Wildcard Search (MBase).

Databases: hardware.
Micro/Cards: Graphics, part 4.

Issue 10, May 13-20.
Pro-Tests: Infomac on Commodore 64, Dragon Maze, MC202 and MUR80 music synthesizers (Apple), Prim directly coupled mod-ems, Epson QX10.

Features: ZX81 graphics part 1; Atari word-processing part 2.
Gameplay: Rescue (Spectrum), Dictator (Spectrum), Roman Empire (Spectrum), Choptifer (Vic 20), Skyhawk (Vic 20).
Program/Cards: Union Jack (Lynx), Escape (Spectrum), CBM Database cards 7-9, Evaluate (MBase), Formula (BBC B).
Databases: peripherals.
Micro/Cards: Graphics, part 5.

Issue 11, May 20-26.
Pro-Tests: BBC Vulture, PFS File for IBM, Apple Pascal; printer comparison; PickedJoyStick Controller for ZX81 and Spectrum; CSE Computer Board.
Features: ZX81 graphics part 2, Music on the Sharp MZ80K.
Gameplay: Motor Mania (Commodore 64), Ori Flight, BBC Music Synthesiser, Missile Maker (Spectrum), Embassy Assault (Spectrum), Tower (Spectrum).
Program/Cards: Homestead Bound (ZX81), Connect Four (Dragon 32), CBM Database cards 10-12.
Micro/Cards: Keyboards.

Issue 12, May 27-June 2.
Pro-Tests: Spectrum word processor, PFS Report on IBM, File Handling for Colour (Apple II), CP80 type 1 printer, TG Trackball; Sord MS.
Features: Epson Basic, Ori sound part 1, Tandy Colour graphics.
Gameplay: Mad Martha (Spectrum), French (Spectrum), Head-banger (Spectrum), Ori roundup, Program/Cards: Election Barchart (Commodore 64), Money Unity (BBC B), Munch (Spectrum).
Databases: Hardware.
Clubnet: clubs (Cambridge Microcomputer Club special).
Micro/Cards: Disk Drives, part 1.

Issue 13, June 3-9.
Pro-Tests: Teletwiter for Dragon, Abercromb Forth for Spectrum, GFS graphics processing system for Apple II - joystick, rulers, Ajfile, Ori music part 2, transferring Basic for Colour Genie and Genie.
Gameplay: Everest Ascend (Spectrum), Colour Genie roundup, Micro Maze (Apple Ace), Oit (Atari).
Program/Cards: Cupid (Ori), Alien (Dragon 32), Time Bomb (Atari).
Databases: peripherals.

Issue 14, June 10-16.
Pro-Tests: Apple Accelerator II board, Modula-2 (Apple II), Apple round-up, Temple of Aphrodite (C64), Airline (Spectrum), Heathrow BBC Speech Synthesiser.
Program/Cards: Newbrain Basic part 1, Sirius designing.
Gameplay: Ah! Dididums (Spectrum), Monopole (Commodore 64), Automonopol (Spectrum), Dragon drums.
Program/Cards: Time Bomb (Atari, cont), Sheep Drive (BBC B).
Databases: Software.
Micro/Cards: Spectrum, Part 1

Issue 15, June 16-22.
Pro-Test: Coms 15, Address Manager (Spectrum), Syres (Commodore 64), MST Database (Epson HX-20), Voice Input Module (Apple II).
Features: Newbrain Basic part 2, Genie scene.
Gameplay: Cleared for Landing, Playing the Ace (Apple II), Valtures, Star Jammer (Dragon 32).
Program/Cards: Mover (BBC B), Piracy Crack (Commodore 64), Pirate Island (Atari, 3 of 9), Micro-music (Colour Genie), Bribat (Dragon 32).
Databases: Hardware.
Micro/Cards: Spectrum, part 2.

Issue 16, June 23-29.
Pro-Test: Atari v. Acorn, word processing for the Commodore 64, Simplifile (CP/M), MPF-II printer, Z80 Pack for BBC, Commodore 64.
Features: ZX81 Maths, US mail order, Atari graphics.
Gameplay: Computer Scrabble (Spectrum), Education (BBC), Horace and Spiders (Spectrum), Bribat (Dragon 32).
Program/Cards: Video Tiler (T199/4A 3 of 6), Bowling (Spectrum), Frog (Apple II).
Micro/Cards: Spectrum, part 3.

Issue 17, June 30-July 6.
Pro-Test: Apple II, The Organizer (CP/M), Trace and ZX Text (Spectrum), Jak 61000 daisywheel, Video Tiler, Farm (Apple II).
Features: Leasing part 1, Atari screen action.
Gameplay: Ori chess, Grand Master (Commodore 64), Escape from Orion (BBC), Jet Pac (Spectrum), The Ring of Darkness (Dragon 32), Spectrum Special.
Program/Cards: Video Tiler (T199/4A cont), Praxid Inland (Atari cont) Word processor (BBC).
Micro/Cards: Sound, part 1.

Issue 18, July 7-13.
Pro-Tests: Tandy 101, RS232 interface (ZX81), ROM page (Commodore), Interface printer buffer, IBM Personal Basic, Spectrum assembler, Newbrain WP.
Features: Leasing part 2, Lynx music.
Gameplay: Spectrum Backgammon, BBC Snooker, Commodore 64 round-up, Serpentine (Vic 20), Pat (Spectrum), Spectrum Safari, Grand Wizard Word Processor (BBC), Fruit Machine (Spectrum).
Micro/Cards: Sound Part 2.

Issue 19, July 14-20.
Pro-Tests: 16-bit chips, Stock control (Epson IX30), Mailplus (Torch), Smith-Corona daisywheel, ZX81 word processing.
Features: Insurance, buying second

hand.
Gameplay: Escape MCP (C64), Escape from Peribus (Atari), Apple round-up, Temple of Aphrodite (C64), Airline (Spectrum), Heathrow BBC Speech Synthesiser.
Program/Cards: Colour Code (Atari), Wreck (Dragon).
Micro/Cards: Sound, part 3.



Issue 20, July 21-27.
Pro-Tests: Rade bareboard, Vix digital tape drive, Seikona colour printer, Toolkit (Spectrum), Bonus (Pet payroll), Newbrain monitor.
Features: Computer art, Dragon scrolling.
Gameplay: Rabbit Trail (T199/4A), Alice Challenge (Atari, Vic 20, T199/4A), BBC round-up, Joint (Spectrum), Molar Mail (Spectrum), Prim Sheep (Spectrum), Time Lords (BBC).
Program/Cards: Tumbler (Ori), Wreck (Dragon), Atari Errors, Speed Race (Vic 20).
Micro/Cards: Sound, part 4.

Issue 21, July 28-August 3.
Pro-Tests: BBC graphics, Newbrain assembler, BBC turtle, Ori printer, Triumph printer.
Gameplay: Franklin's Tomb (Dragon), Hammer House of Horror (Spectrum), Jumpman (64), Jumping Jack (Spectrum), Fourth Encounter (Vic), Cyclons (64).
Program/Cards: Collection (Vic), Bomber (64), Definer (BBC).
Micro/Cards: Sound, part 5.

Issue 22, August 4-10.
Pro-Tests: Spectrum Forth, BBC graphics, Music synthesizers, IBM plotter, Brother daisywheel, Malton keyboard, Mupad.
Features: Genie assembler, Dragon machine code.
Gameplay: River Rescue, Ori attacks (Atari), Zork (64), Knot in 3D, 3D Combat Zone (Spectrum), Motor (Ori), Motor Lair (Spectrum).
Program/Cards: CP/M part 1.



Issue 23, August 11-17.
Pro-Tests: Sord Basic-4, Tasword, BBC microprocessors, Microdrive, Tandy Model 4.
Features: Dragon machine code, Atari controllers.
Gameplay: Bridge Master, Sixx, Mania (BBC), Spectrum, Atari roundup, Candy Flow (Dragon 32), Ori, Everest (Dragon).
Micro/Cards: CP/M, part 2.

Issue 24, August 18-24.
Pro-Tests: 7-Maker III, Spectrum Fifth, daisywheels surveyed, Spectrum digital trace, Laser.
Features: Videotex.

machine code.
Gameplay: Ori roundup, Cookie, Egg Farm, Xadom (Spectrum), Sea Lord (BBC), Lantania (Dragon), The Island (64).
Micro/Cards: Commodore 64, part 4.



Issue 25, August 25-August 31.
Pro-Tests: Election, Simons Basic, Ori monitors, Microdrive.
Features: Newbrain map, Acorn Atom, Dragon machine code.
Gameplay: Suspended (64), Terror Dakits, Tranx Am (Spectrum), Dragon roundup, Jogger (Ori), Dragon (IBM).
Micro/Cards: Commodore 64.

Issue 26, September 1-September 7.
Pro-Tests: Microtan 65, BPL, BBC tracer, 80 column Pet, Ori interface.
Gameplay: Magic Mountain, Smugglers Cove (Spectrum), Spectrum roundup, Matrix (64), Ninja Warrior (Dragon), Dallas, (Ori), Call to Arms (IBM).
Micro/Cards: Commodore 64.

Issue 27, September 8-September 14.
Pro-Tests: Sharp MZ700, BBC Logo, Apple editor, IBM music, Z80 assembly.
Gameplay: Zip-Zap, Zoom (Spectrum), Spectrum roundup, Hammer Bover, Bemp-Space Rescue (64).
Micro/Cards: Dragon, part 1.

Issue 28, September 15-September 21.
Pro-Tests: Zenith Z100, Snail Logo, Atari Supergraphics, Newbrain CP/M, IBM cards.
Features: The Witness, Super Scramble, Sixx (64), Harrier Attack (Ori), Morocco Grand Prix (Dragon), Pharaoh's Tomb (Spectrum).
Micro/Cards: Dragon, part 2.

Issue 29, September 22-September 28.
Pro-Tests: Portico Miracle, Dragon editor, BBC toolbar, Dragon drives, Apple light pen.
Features: 18X0 disassemblies, TI graphics, Phantoms.
Gameplay: Gridder, Glooper, California Gold Rush (64), Ori roundup, Bomb Alley (BBC), Split, General Election (Spectrum), Cannon (Dragon 32).
Micro/Cards: Dragon, part 3.

Issue 30, September 29-October 5.
Pro-Tests: NEC's Advanced Personal Computer, Financial Printer (IBM), Kingman's a.b.c. Countdown, Hot Dog Speller (Spectrum), Prism VT8000, Extended Basic (Dragon).
Features: Spectrum machine code, Dragon's Halls of Death/Sword of Fargool (64), 747 Flight Simulator (BBC), Dragonly (Dragon 32), Forensic/Note Index (BBC).
Program: Search (ZX81), Countdown.
Databases: Hardware.
Micro/Cards: Everything you wanted to know about program-
part 1.
Clubnet: Clubs.

Issue 31, October 6-October 12.
Pro-Tests: Atari 1000L, Condor Speed 2 (IBM), Acorn Non-volatile Diary/Filing system (BBC).
Features: Ori sound routines.
Gameplay: Greedy Gulch (Spec-



Issue 32, October 13-October 19.
Pro-Tests: Mattel Computer Adapter (Intellivision), Sprint-Gen (BBC), Typing Station (Apple), MCoDer 2 (Spectrum), Cirtech (Epson Programmer (Apple)).
Features: Teletext options, Inside the Genie.
Gameplay: Space Shuttle Program (Dragon 32), Atari roundup, Spectrum 2/Poolball Pools Program (Spectrum).
Databases: Software.
Clubnet: Clubs.
Programs: Bees Away (BBC), Composer (Ori).
Micro/Cards: Everything you wanted to know about program-
part 2.
Clubnet: User Groups.

Issue 33, October 13-October 19.
Pro-Tests: Mattel Computer Adapter (Intellivision), Sprint-Gen (BBC), Typing Station (Apple), MCoDer 2 (Spectrum), Cirtech (Epson Programmer (Apple)).
Features: Teletext options, Inside the Genie.
Gameplay: Space Shuttle Program (Dragon 32), Atari roundup, Spectrum 2/Poolball Pools Program (Spectrum).
Databases: Software.
Clubnet: Clubs.
Programs: Bees Away (BBC), Composer (Ori).
Micro/Cards: Everything you wanted to know about program-
part 3.

Issue 34, October 20-October 26.
Pro-Tests: CWP's Context, Sinclair ZX Spectrum 2, Wat-



Issue 34, October 27-November 2.
Pro-Tests: NEC's PC-801A, Simply File (64), The Forest (Spectrum), Amcom DFS (BBC), Carah Microspeech (Spectrum).
Features: Ori Machine Code.
Gameplay: Fort Apocalypse/Posyan (Atari), Death Cruise/Chang (Dragon), Treach Canyon (BBC), Football Manager/Pool (Spectrum).
Programs: French Text (Apple), Babyfall (ZX81), Count (Vic 20), Misc/Arth (Vic 20), Road Hog (BBC).
Databases: Hardware.
Micro/Cards: Everything you wanted to know about program-
part 4.

Issue 35, November 3-November 9.
Pro-Tests: Kaypro 10, Stock Control (Spectrum), Educational games (BBC), Ori EP22 electronic typewriter, ADS Centronics graphics (Spectrum), Jupiter Ace (Spectrum), Vahalla/Spectrum (BBC), Slinky (Atari), Hexpert (64).
Programs: Mini Math (Spectrum),

Multi-Square (Oric).
Databases: Peripherals.
Micropaedia: Everything you wanted to know about programming, part 6.

Issue 36, November 10-November 16.
Pro-Tests: Tiger from H.H. ZX81-Forth, Exom (Oric), Cycle Planner, Growth Tracker/Diet/Diet Master (Spectrum), U-Com 2 (Apple).
Features: Newbrain sound. BBC FX commands.
Gameplay: Creepers (Vic 20), Esterminter (64), Spectrum round-up, Death Mins of Sirus (Dragon 32).
Programs: Falklands Raid (BBC), Mini Math (Spectrum), Pyramid (Spectrum).

Databases: Software.
Micropaedia: Everything you wanted to know about programming, part 7.



Issue 37, November 17-November 23.
Pro-Tests: Apriorit, Paint (Atari), BBC Micro Toolbox, Spectrovide Compumate (Atari VCS 2600), Big Ear.
Features: Flight simulators, Spectrum screening.
Gameplay: Empire/Treehouse/Tomb, Crystal Chalice, Temple of Zorn (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Conveyor/Planfall (64), Bagabog/Gordon (Spectrum).
Programs: City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (64).
Databases: Clubnet.
Micropaedia: Everything you wanted to know about programming, part 8.



Issue 38, November 24-November 30.
Pro-Tests: Coleco's Adam, Small Business Accounts (Spectrum), Masterfile (BBC), Monitor roundup.
Features: Apple programming, New-Brain editor part 1, Dragon action part 1.
Gameplay: Dragon roundup, Zepplines/Blue Max (Atari), Skyrambler/Falcon Patrol (64), 737 Flight simulator (BBC).
Programs: Shipment (Spectrum), Monitor (64).
Databases: Hardware.
Micropaedia: Guide to Monitors.

Issue 39, December 1-December 7.
Pro-Tests: Dragon 64, Tandy CPC/220, White Knight II (BBC), Cross Reference Utility (IBM).
Features: New-Brain editor part 2, Dragon Action part 2.
Gameplay: Oric roundup, Haunted Hedges/Corridor of Geron (Spectrum), Microbe One Hundred & Eighty (BBC), Atari roundup.
Programs: Lower CLS (Spectrum), Shipment (Spectrum), Monitor (64), Basic Search (BBC).
Micropaedia: Buyer's Guide to Micros.



Issue 40, December 8-December 14.
Pro-Tests: Times 2058, Thermal Printer TP-10, Cambridge Computing joystick (Spectrum), Beethoven/The Synth Music Processor (BBC), Vizaviviz/Vizapell (64), Education games (Spectrum).
Features: New-Brain editor part 3, Dragon 64 roundup.
Gameplay: Pinball Wizard (Vic 20), The Quest of Merrivald (64), Wavy Nave/Savage Pond (Atari).
Programs: Link Four (Spectrum), Tilt (Dragon).
Micropaedia: Buyer's Guide to Peripherals.

Issue 41, December 15-December 21.
Pro-Tests: Apple II, Byte Drive 500, PMAC Spectrum Cleaner, Commodore 1701 Colour Monitor, BC Basic (64), Database/MST-Calc (Dragon).
Features: Computerised Psychotherapy (BBC), Spectrum Display.
Gameplay: Micropoly/Pettigrew's Diary (Dragon), 64 roundup, Destructors/Destructors/Sheep Panic (Spectrum).
Programs: Colony Invader (Spectrum), Grid Bike (Vic 20).
Micropaedia: Buyer's Guide to Software.

Issue 42, December 22-January 4.
Pro-Tests: Spectrum add-on (U-Microcomputers system), Oric 1 Faileter, Games Designer (Spectrum).
Features: Micros of 1983, Computer Security, BBC word processing, Dragon 64 roundup.
Gameplay: International Football (64), Grouch/Chopped Flag (Spectrum), Way Out/Joe Blow Jack (Atari), Supervaders/Outback (Vic 20), Danger Ranger/LP Perspector (Dragon 32).
Databases: Clubnet.
Micropaedia: Games Special.

Issue 43, January 7.
Pro-Tests: IBM Junior, Grafpad (BBC), Walters WM80 printer/Despic (Spectrum).
Features: Computerspec, Spectrum Display, Tabs on Oric.
Gameplay: Trace Race/Pinball (Dragon 32), Colour Genre round-up, Mr Hunter/Killer-Me/Wimpy (Spectrum), Crazy Cavenom/Goodness Gracious (64).
Programs: Jungle Chase (Oric), Screen Dump (BBC).
Databases: Hardware.
Micropaedia: Electron part 1.

Issue 44, January 14.
Pro-Tests: Hitachi MBE-1602, Acorn Teletext (BBC), Integrex Colourjet printer, DTL-Basic (64), Microphone 4251/Multifont (Spectrum).
Features: Adventure games, Colours/Gene character.
Gameplay: Devil Assault/Wasps & Dragon Racer (Dragon 32), Siren City/Forbidden Forest (64), Survival/Countdown (Vic 20).
Programs: Minelife.
Databases: Peripherals.
Micropaedia: Electron part 2.

Issue 45, January 21.
Pro-Tests: Portables — Commodore SX60, Olivetti M10, Acorn sparklet printer, Turbo 20 daisy wheel, Spectrum educational software, BBC graphics extension ROM.
Features: Bargain buys, Making the most of your micro.
Gameplay: Viking and Pub Track (Dragon), Trax and Wild West Hunter (Spectrum), Atari/Commodore 64 round-up.
Programs: Battleship/Fighter (BBC), Spectrum 64.
Databases: Software.
Micropaedia: Electron part 3.



Issue 46, January 28.
Pro-Test: Apple Macintosh: BBC sideways ROM board, IEEE interfaces for Commodore 64, Silver Reed EX44 typewriter/printer, Bridge on Spectrum and Dragon, BBC filing program.
Features: Buying by mail order, programming the Memotech.
Gameplay: Barry Burgers and Gangers (Spectrum), Birds, Barage and Plankwalk (BBC), Blue Moon and Dancing Feats (Commodore 64).
Programs: Caves of Treasure (ZX81).
Micropaedia: Modems and communication.

Issue 47, February 4.
Pro-Tests: Sinclair QL, Atari Touch Table/Silver Reed EXP500 daisywheel, IBM Color, BBC Spell Check.
Features: Programming the Memotech part 2, Low cost printers.
Gameplay: Mothership and Quintic Warrior (Commodore 64), Two Gun Turtle and the Martians (Spectrum), Atari adventures, Spectrum round-up.
Programs: Pat Hole (Dragon).
Databases: Hardware.
Micropaedia: A to Z of Atari part 1.



Issue 48, February 11.
Pro-Tests: Spectravideo 328, Atari 800 XL, Dragon 32 disk drives, low cost monitors, Artec C (Apple), BBC educational software.
Features: Sideways printing on Epson HX20.
Gameplay: Bedlam and Morris Meets the Bibles (Spectrum), Commodore 64 round-up, Zeron's Kingdom and Flight Zero-One Five (Vic 20).
Programs: Gridtrap (Lynx).
Databases: Peripherals.
Micropaedia: A to Z of Atari part 2.



Issue 49, February 18.
Features: Oric Atmos, tracker ball controllers, Spectrum speech synthesizers, Rainbow Writer (Dragon), Colour Genie assembler, Spectrum educational programs.
Programs: Computer jargon, 42-column display on Spectrum.
Gameplay: Quadrant and Jepac (Vic 20), Cray Ballroom and Supacatchra (Commodore 64).
Programs: Sprite generator (Commodore 64).
Databases: Software.
Micropaedia: A to Z of Atari part 3.

Issue 50, February 25.
Pro-Tests: Sanyo MBC50, Commodore speech synthesiser, BBC real-time control interface, BBC machine code tracer, Atari home utilities.
Features: Expanding your Spectrum, introduction to Lisp.
Gameplay: Urban Upstart and Godalla and the Martians (Spectrum), Shurtlaze and Hooked (Dragon).
Programs: Minescape (Oric), Clubnet.
Micropaedia: Printers part 1.

Issue 51, March 3.
Pro-Tests: Sharp's PC5000, Graphics Package (Oric), Fancy Font (CPM), Torch, Superbase Application Database (64), Printer round-up, IEEE 488 Interface.
Features: Microdrive data files.
Gameplay: Spectrum selection, RoboBots (TP994A), Baby Bytes/Bristles (Atari).
Programs: Millipede (BBC/Elecron).
Databases: Hardware.
Micropaedia: Printers, part 2.

Issue 52, March 10.
Pro-Tests: Wren, MSX, Multisynth 64, Mr T's Number Games etc (BBC), Spectrum, 64, Hybrid cable (Oric, Atmos).
Features: Adventure games.
Gameplay: Dragon roundup, Snorter/Free Fall (BBC), Spectrum roundup.
Programs: UFO (Vic-20), Morse Code (BBC), Gary the Guitar (64).
Databases: Peripherals.
Micropaedia: Printer, part 3.

Issue 53, March 17.
Pro-Tests: Yamaha YHS50, Tandy TRS-80 modem (R323), MDDFS (BBC), Toolkit (BBC), The Quill (Spectrum).
Features: Screen technology, Atari graphics.
Micropaedia: Megahawk/Megawarz

(64), Castle of Doom/Fishy Business (Dragon 32).
Programs: Battle Stations (Spectrum), Colour Genie (Vic 20).
Databases: Software.
Micropaedia: Reaching for the Atmos, part 1.



Issue 54, March 24.
Pro-Tests: IBM's Portable PC, Spectrum keyboards, Beethoven, Issues Deleter (Vic-20).
Features: Atari graphics, Chip shortage.
Gameplay: Airstrike 2/Pele Position (Atari), Deathscape/Fighter Pilot (Spectrum), BBC roundup.
Programs: Orithello (64), Charpart (CGL M-5).
Clubnet: User groups and clubs.
Micropaedia: Atmos, part 2.

Issue 55, March 31.
Pro-Test: H-P 150, Light pens (BBC, 64), Micro-Prolog (Spectrum), Electron Graphics System.
Features: Spectrum routines, Consumer rights.
Gameplay: Patience/Metagalactic Llamas Battle at the Edge of Time (Vic-20), Lok/Rat Split (Oric), Tennis (Atari).
Programs: Fast Draw (Dragon 32), Flim simulator (Atari).
Databases: Hardware.
Micropaedia: Communications, part 1.

Issue 56, April 7.
Pro-Tests: Voltax, Type 'n Talk, Issues Command (BBC, Spectrum, 64), Commodore 1001 disk drive, Apple's Macintosh, Animator (Dragon 32), Knowbase (IBM).
Features: Spectrum maths, Adventure in history.
Gameplay: Hunchback Artec/Challenje (64), Defence Force/Psychic II (Oric), Volcanic Planet (Spectrum).
Programs: Ace King (Vic-20), Lynx VAI.
Databases: Peripherals.
Micropaedia: Communications, part 2.

Issue 57, April 14.
Pro-Tests: Microkey, Morex Disk Drive Interface (Spectrum), Atari II05, colour printer/plotter, FT, Moneywise (IBM PC, Sirius).
Features: Assembly course, Port-Base.
Gameplay: Learning games (Spectrum), Oric, Air Traffic Control/Super Spy (Dragon), Neptune's Daughters/China Miner (64).
Programs: Trinitas (BBC), Electron (Oric).
Micropaedia: Communications, part 3.

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More hints and tips to make programming a little easier.

You all know the feeling: after hours, days or even weeks spent on a particular problem you suddenly see the answer. Or on one of those late-night expeditions through the memory map you find some undiscovered feature. Well don't keep it to yourself—send it here. We pay £5 for every tip and routine printed and £25 for the Microwave of the Month.

Send your contributions to: *Microwaves, PCN, 62 Oxford Street, London W1A 2HG.*

IF statements and bubble sorts

After reading about replacing IF statements with boolean operations, I thought it might be possible to apply this to a bubble sort to speed it up. Unfortunately this method of exchange was slower on my computer (NEC 8201a) than the ordinary IF exchange as normally used in sorts of this kind.

This may not apply to other versions of Basic. When converting the program, note that the operation of the algorithm depends on a true condition producing a -1 and false a 0.

*Kenn Garroch
Peripherals Editor.*

```
10 DIM A(20)
20 FOR T%=0 TO 25
30 A(T%)=25-T%
40 PRINT A(T%); " "
50 NEXT
60 PRINT TIME#
70 FL%=0
80 FOR T%=0 TO 25
90 S=A(T%)
100 T=A(T%+1)
110 A(T%-(S<T))=T
120 A(T%-(S>T))=S
130 FL%=FL%-(S>T)
140 NEXT
150 IF FL%<0 THEN 70
160 PRINT TIME#
170 FOR T%=1 TO 26
180 PRINT A(T%); " "
190 NEXT
```

Vic's operation speeded up

Location 37879, discovered by Ms Wright on the Vic 20 (Issue 60) is a lot more useful than she realised.

It can be used to speed up the operation of the Vic.

This is useful for adding difficulty to games and zest to graphics. It does not, however, appear to work with the super expander graphics. Speed is achieved here by using Multi-colour mode.

The higher the value POKED into 37879, the faster the operation.

eg POKE 37879,255 — fast
POKE 37879,1 — slow
*David H Williams, Holywell,
Clwyd, N Wales.*

Oric Atmos command mix-up

For the benefit of anyone who is confused by the assembler listing of a machine code routine in the centre of page 215 of the Oric Atmos manual, the command at address #606 should read:

606 ADC\$003,X

Even though the remark and OP-CODE are correct, this could easily cause confusion to someone reading about machine code for the first time.

*M Webb
Hatherly, Cheltenham, Glos*

Spectrum programs unmergeable

I have discovered a near fool-proof way of protecting your Spectrum programs from being listed.

No matter what kind of protection lies within the program, if it is written in Basic, it can be merged (MERGE""), which prevents the Basic from auto running. To prevent this, simply write your Basic program and put all the protection routines needed in the program; on the last line put:

```
9998 POKe 23613,82:POKE
23614,84:SAVE "programe"
CODE 23552, APPROX
LEN + 1000
9999 GOTO start of program
The GOTO length can be found with:
```

PRINT 41472-(65535-USR 7962)

This will not verify because the system variables have been saved along with the program and since these are constantly changing, there will be no match.

The program is now unmergeable and is now unable to be broken into because of line

Vic goes into reverse

An interesting effect that can improve an explosion, or the demise of a player, in a game is the reversing of the screen contents a few times. The following routine can be used to this on the Vic 20.

The program is stored in a part of the memory that is not affected by any operation performed by the Vic and hence no memory is lost when the routine is used. It can be accessed from Basic using SYS 730 and from a machine code program via JSR \$00DA.

```
1 FOR A=730 TO 738:READ B:POKE A,B:NEXT A
2 DATA 173,15,144,73,8,141,15,144,96
LDA $900F
EOR #08
STA $900F
RTS
M J Davies, Llandiello, Dyfed.
```

All the shades of the Oric

On reading Mr Singh's letter (PCN Issue 58) about mixing colours on the Oric 1, I wrote a program which shows a complete range of the possible colours.

It lasts for approximately 12 minutes even though line 0 increases the speed somewhat.

Stephen Trask, Newbury, Berks

```
0 POKe 775,255
1 FOR A=16 TO 23
2 HIRES
3 FOR B=16 TO 23
4 FOR C=16 TO 23
10 FOR X=1 TO 50:FILL1,1,A:FILL1,1,A:NEXT
20 CURSET 1,1,3
30 FOR Y=1 TO 50:FILL1,1,C:FILL1,1,B:NEXT
40 CURSET 1,1,3:NEXT C,B
50 NEXT A
60 POKe 775,39
```

Cure for bodged codes

Oric printer users may, like myself, have problems of corruption of characters caused by the keyboard interrupt system producing incorrect codes on the printer.

The following routine may cure this. When run it installs a machine code routine activated by the ! command placed in a program line before printing, so for example:

(line number)!:LPRINT A\$
This disables the keyboard during printing and enables it again on return to the Ready mode. It can also be used in immediate mode allowing listings to be made.

```
A H Homer, Lincoln, Lincs.
5 REM PRINTER INTERRUPT ROUTINE
6 REM USE ! BEFORE PRINTING
7 :
10 DOKEY#2F5,1028:FOR J=0TO23:READ:
CS=CS+D:POKE1028+J,D:NEXT
20 IFC$<208 THEN PRINT"DATA ERROR":STOP
25 PRINT"OK...":NEW
30 DATA 169,16,133,27,169,4,133,20,32,202,230,96
40 DATA 169,237,133,27,169,203,133,20,32,4,237,96
```

9998 statements 1 and 2.

An alternative to this method is:

```
9998 POKe 23613,82:POKE
23614,84:SAVE "programe"
CODE 16384, approx
```

length + 8200

9999 GOTO start of program
This will save SCREEN\$ into the bargain.
*Nigel Foster,
Hinkley, Leics*

Interesting exhibits and exhibitors will be at this club's computer show.

If your association has something special on the agenda or if you've just started a new one, contact us at Clubnet, Personal Computer News, VNU, 62 Oxford Street, London W1A 2HG.

Make a date with Yate & Sodbury

Micro fans in the Avon area can look forward to weekend frolics at the Yate Computer Show, to be held by the Yate and Sodbury Computer Club on Saturday, June 2.

This isn't their first event. 'We did a smallish show last October which drew about 300 people but we want this one to draw more this time,' said organiser Alan Thackray.

The show will feature 14 stands and represent two micro companies and possibly W H Smith too, along with the public library which will demonstrate its equipment.

Using a BBC, the club's stand will demonstrate a Floppy data storage system from Himag Systems in Falmouth. Mr Thackray says it's half the price of a floppy disk with faster access time.

Also to be exhibited is a Cheetah chip speech synthesiser for the BBC and Spectrum, plus software that members use at school. 'We want to give the public, especially parents, an insight into what micros are actually used for.'

Towards the year's end, they hope to start classes in Basic for 50 members but Mr Thackray admits to having had a lukewarm response to organised activity.

Another battle cry is also familiar — there are lots of men in the club, but where are the women? So far only one female has joined.

Wendie Pearson

Name: Yate & Sodbury Computer Club **Venue:** Newman Canteen, Station Road, Yate, Avon **Meetings:** Fortnightly on Monday evenings **Contact:** Alan Thackray. Tel: 0272 677571



Bring your computer alive with a Jessop Turtle — the radio-controlled robot.

The principle of teaching very young children fundamental computing through a Jessop Turtle has long been recognised and this vision is endorsed by research at the Massachusetts Institute of Technology and at Edinburgh University and is already used in hundreds of British primary schools.

The abstract computer program becomes a visible, concrete reality, through the Jessop Turtle: quickly learned, easily assimilated and exciting to operate.

And two new sets of developments further enhance the Turtle to increase its capabilities and application as a teaching aid.

• **The new remote radio-controlled Turtle** (two-way to direct and confirm commands) is no longer restricted by an umbilical cord, and children cannot interrupt the process with their bodies as would happen with infra-red control.

• **The availability of full Logos** for the Sinclair Spectrum and the BBC micro will open up new worlds for Turtles — and their users. It will be possible to experiment with Turtle speech and vision without needing to learn a new language.

The Jessop Turtle has a whole range of uses:

- As an introduction to computing for children and adults: the logical, direct process allows quicker understanding of programs and

provides proof in action' for experimental programming.

• In the secondary school, it can provide low-cost, efficient entry to robotics. Its optical encoders, which tell the computer how far the Turtle has travelled or whether the pen is raised or ready to trace its path, are similar to those used in industrial robots.

• Secondary school students will turn the machine code program, used to control the Turtle, into the basis for a series of experiments and exercises in machine code programming and robotics.

• Because of its extreme accuracy, the Turtle can produce wall charts, maps and drawings.

• In the Jessop Turtle, not only is everything visible

through its clear 'shell', but the hardware and software is designed for further investigation.

• And the Turtle is being constantly upgraded: during the next year, you'll be able to add vision, speech and range-finding sensors to further your understanding of robotics.

The Jessop Turtle at a special summer discount price has never given better value. And a Turtle bought now can be enhanced, as developments occur, with conversion kits. (You can even convert your existing Turtle from umbilical cord to remote-control.) And Jessop Turtles can now be driven from Sinclair, Atari, Apple II, RML, Acorn/BBC, Commodore and IBM micros. Another reason why Jessop Turtles knock the spots off their rivals.

Please complete and return this coupon with your cheque for £182.27 (£155 + £3.50 P & P + VAT £23.77) to get your Jessop Turtle at the special Summer Offer Price. Schools & EAs need not send money: simply complete the coupon and return it with your official order.

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What Micro do you have?

Disc or Cassette based?

Do you have Logo software? YES/NO
PCN



"Received and understood!"

Which book would your micro want you to buy? PCN's review pages help you choose.

'Spectravideo Computing' by Ian Sinclair, published by Granada at £6.95 (paperback, 172 pages).

The blurb on the back of the book doesn't augur well for what's inside. "The Spectravideo's 32K RAM is expandable to 256K", it chunteres. Actually it isn't — it's expandable to 144K. But this seems to be the only obvious howler.

However, perplexed by the quantity of Ian Sinclair books winging into the office, we compared the chapter headings with another in the series, Memotech Computing. The first few headings run as follows, with the Memotech headings in brackets:

- 1 Setting up the Spectravideo (Setting up);
- 2 Becoming a star of the screen (Screen time);
- 3 Palace of varieties (A bit of variety);
- 4 Repeating your self (Repetitions and decisions);
- 5 Programs with strings attached (Programs with strings attached — and so on).

There's nothing wrong with using a tried and tested formula, of course, if the formula works. But I really don't think this one does. Almost invariably Mr Sinclair spends an inordinate time on telling you how to set up the flavour of the month, then plods through a fairly opaque (for beginners at least) explanation of printing, variables, subroutines and strings with reference to the machine he's writing about at the time.

The point is that, if it takes nine and a half pages to tell a beginner how to wire up a machine and plug it in, what is the beginner going to make of the following: "The computer converts most of the number it works with into the form of a fraction and a multiplier. The fraction is not a decimal fraction but a special form called a binary fraction, and this conversion is seldom exact."

What Mr Sinclair is doing here is just banging into something that he knows about, and forgetting that terms like 'binary' and 'multiplier' need explaining.

The book isn't structured enough to be about learning, and although it's overclear in parts, it isn't really clear enough to be an alternative manual.

So we'll have to keep wishing for the Spectravideo Programmer's Reference Guide . . .

'First Steps With Your BBC Micro, A Beginners' Guide to Simple Programming' by Caroly Hughes, published by Fontana at £1.50 (paperback, 171 pages).

This is basic to the extreme — including, as it does, such things as an adaptor that can take three or more plugs at once.

The book shows how to type using two fingers, followed by chapters on first steps to programming, which will be useless if you've spent a few hours' programming already.

Commands, modes, strings, variable boxes, correction of typing errors using editing keys, and so on are detailed and colour and sound get a mention, with tips on how to write your own games using these facilities.

This is the sort of book which ensures you can't make a mistake — it even illustrates the BBC's cassette socket so you don't try and put the cassette lead in the wrong hole.

All in all, it's a good guide for the absolute beginner, if a little slow.

WP

'Micro Man' by Susan Curran and Gordon Pask, published by Century Publishing at £4.95 (paperback, 220 pages)

Curran and Pask, self-appointed missionaries of the micro processor, take the social implications of computers to the common people. If you ever thought there must be some grand reason for the hours spent at your micro, these are the people to explain your place in the scheme of things.

The 'micro man' of the title is mankind living in a computer environment. Fortunately, most of the book doesn't match up to the esoteric levels of the meaty introduction where the authors suggest it is part of our evolution to have created computers — or, in their terms, another species.

The book starts in areas that are easier to get to grips with: Boole and Babbage, how computers affect education, work and play, and telecommunications. There are revealing results of a survey of what people think computers are and should be used for.

Whether discussing natural philosophy or more mundane matters, the book is built around varied and colourful

pictures. But what do an African village massacre, waterlilies and Sherlock Holmes have in common besides their appearance here? Nothing much, I suspect.

It seems that given the starting point 'micro man', any picture can be tied to a text about computers and civilisation — but using a photo of slaughtered civilians to point out that they weren't killed by computers seems to me to be back to front. However, the text's wide scope is stimulating; it's also backed up with a splendid index.

This erudite treatise demands thought and concentration. At times absurdly pretentious, at others just absurd, it is nevertheless a rattling good read, even if it doesn't tell you how to get more out of your micro — in the short term.

HA

'Computing for all the Family with a BBC Computer' by Tony Noble, published by Sigma Technical Press at £6.45 (paperback, 297 pages).

This book will not be every Beeb user's cup of tea. Written by a headmaster, it leans towards the educational field rather than giving a general outlook.

It introduces the uses of micros and then goes through 52 steps to explain the machine. Most aspects of the BBC's capabilities are covered, and you learn to use the keyboard in a crawl-before-you-walk fashion. Diagrams illustrate salient points and, where appropriate, a drawing of a screen shows what your computer should produce if you're doing everything right.

These sections cover such things as graphics, colours string handling etc. The control structures are introduced in these sections as they become of use. That is, things like REPEAT UNTIL are taken along with MOVE and DRAW enabling the repetition of lines.

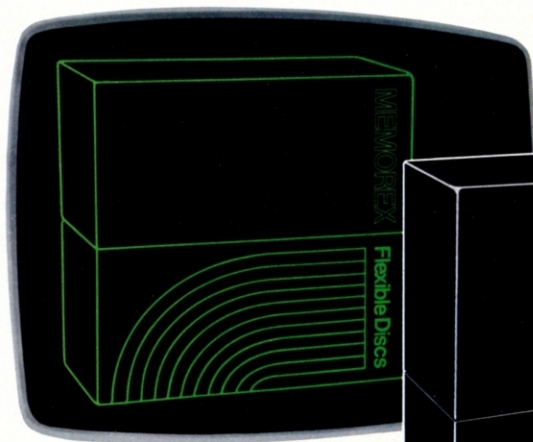
The book then returns to chapter mode with one on better Basic. This includes flow charts and program design. The book finishes with a chapter on simulations and then one on listings, containing the ideas covered previously.

All in all, solid but not outstanding.

SG



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MEMOREX

Gavin Monk shows you how to get a good sound out of the Spectrum with Basic and machine code.

Making up new noises

The ZX Spectrum Basic BEEP command is limited to say the least. The single channel and lack of speed mean only the simplest sounds can be produced in Basic. Other computers such as the BBC and Commodore 64 offer multi-channel sound which is far superior. However, the sound on these models is still difficult to use from Basic because of the many parameters which need to be set (up to fourteen on the BBC.) Oric Basic also offers multi-channel sound but with the addition of set commands to give zaps, explosions

and the like. This short machine code routine for the Spectrum gives preset sound routines similar to those on the Oric.

The loudspeaker on the Spectrum is controlled by bit 4 of port 254. This can be illustrated by the following Basic:

```
10 OUT 254,16: OUT 254,0: GO TO 10
This produces a buzz from the speaker and a black border. A black border appears because port 254 controls several other things besides the loudspeaker (to keep down the production costs of the Spectrum). The table below shows what each bit
```

of port 254 performs.

Bits 0-2	Border colour
Bit 3	Mic socket
Bit 4	Loudspeaker
Bits 5-7	Unused

The use of the port to control the border colour as well means that it is hard to output directly to the port. The buzz produced by the Basic is the highest note that can be output directly from Basic. However, in machine code use of the port can produce a wide range of sound effects.

Another way of generating sound in

```
1 REM *****
2 REM * Machine Code Sounds *
3 REM * Copyright G B Monk *
4 REM *****
9 REM Lower RAMTOP and set up
machine code
10 BORDER 7: PAPER 7: INK 0: C
LS
15 CLEAR 65199: REM 32499 for
16K
20 GO SUB 5000: REM set up mac
hine code
30 LET explosion=stari
40 LET zap=stari+28
50 LET step=stari+57
60 LET siren=stari+60
90 REM demo program
100 CLS
105 LET a$="MACHINE CODE SOUNDS
"
110 LET x=6: LET y=4
120 GO SUB 2000: REM print stri
ng
130 FOR i=0 TO 7: BORDER i: RAN
DOMIZE USR zap: NEXT i
140 LET a$="Copyright G B Monk
"
150 LET x=6: LET y=7
160 GO SUB 2000: REM print stri
ng
170 FOR i=0 TO 7: BORDER i: RAN
DOMIZE USR zap: NEXT i
180 LET a$="1984 "
190 LET x=14: LET y=11
200 GO SUB 2000: REM print stri
ng
210 FOR j=1 TO 3: FOR i=0 TO 7:
BORDER i: RANDOMIZE USR zap: NE
XT i: NEXT j
220 CLS
230 PRINT AT 10,5:"I'm coming t
o get you."
240 FOR i=30 TO 7 STEP -1: PAUS
E i: RANDOMIZE USR step: NEXT i
250 PRINT AT 10,5:"You have bee
n warned."
260 FOR i=1 TO 5: RANDOMIZE USR
siren: NEXT i
270 CLS: PRINT AT 10,12: FLASH
1:"GOT YOU"
```

Set screen attributes, lower RAMTOP and call machine code loader routine

Set up machine code call routines

Demo Program
Prints messages on the screen and produces sound effects



SPECTRUM SOUND

```

280 RANDOMIZE USR explosion
999 REM users selection
1000 PAPER 1: BORDER 1: INK 7: C
LS
1010 PRINT "TAB 6; [Z]-ZAP"
1020 PRINT "TAB 6; [S]-STEP"
1030 PRINT "TAB 6; [S]-SIREN"
1040 PRINT "TAB 6; [X]-EXPLODE"
1045 PRINT "" " PRESS KEY FOR SO
UND REQUIRED"
1049 REM read keyboard
1050 LET a$=INKEY$
1060 IF a$<"1" OR a$>"4" THEN GO
TO 1050
1070 RANDOMIZE USR (start+0*(a$="
4")+32*(a$="1")+37*(a$="2")+60*(
a$="3"))
1080 GO TO 1050
1999 REM print a$ at x,y
2000 LET len=LEN a$
2010 FOR i=31 TO x STEP -1
2020 IF i+len>31 THEN PRINT AT y
,i;a$( TO (32-i))
2030 IF i+len<=31 THEN PRINT AT
y,i;a$
2040 RANDOMIZE USR step
2050 NEXT i
2060 RETURN
4999 REM set up machine code
5000 LET start=65200: REM 32500
for 16K
5005 RESTORE
5007 LET cs=0: REM checksum
5009 CLS : PRINT "PLEASE WAIT WH
ILE MACHINE CODE IS P
OKED"
5010 FOR i=start TO start+33
5020 READ a: POKE i,a
5025 LET cs=cs+a
5030 NEXT i
5035 IF cs<>8396 THEN CLS : PRIN
T "Checksum error in data": STOP
5040 RETURN

```

This section of the program gives the user an on screen menu allowing him to select which sound he requires to hear

Line 1070 calls the required routine

Print a\$ moving in from the right until it is in position x,y

Poke and check machine code

```

5090 REM machine code data
5099 REM explosion
5100 DATA 58,72,92,31,31,31,200,
7,225,229,95,14,0,32,15,126,200,
16,131,211,254,65,16,254,35,21,0
2,243,10,32,200,201
5199 REM zap and step
5200 DATA 1,16,0,24,3,1,60,0,33,
0,5,237,66,17,1,0,229,197,205,13
1,3,193,225,124,167,32,240,201
5299 REM siren
5300 DATA 1,60,3,33,0,5,17,1,0,4
3,229,229,197,205,131,3,193,225,
237,66,225,32,200,201

```

Data for the three machine code routines

machine code is to use the ROM BEEP routine and location 03B5 Hex. This routine can be used by loading the DE register pair with the duration and the HL register pair with a value dependent on the frequency. The registers affected by the routine are AF, BC, DE, HL & IX.

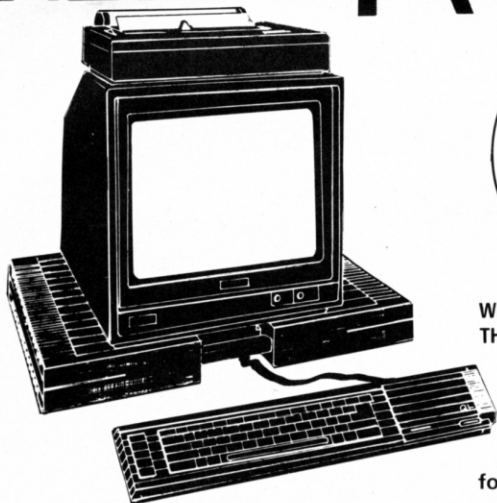
Type in the Basic Program shown in Listing 1, taking special care with the data in lines 5100-5300. Now save the program

before running it. If you are greeted with the message "Checksum error in data" you should recheck the data and try again. If all goes well, a demo of the new sounds should occur.

After the demo you are presented with a menu which allows you to press keys 1-4 and produce one of the four preset sounds; zap, step, siren, or explode. Now, when you are fed up with playing, break into the

program by pressing the Caps Shift and Space keys. Now type RAND USR zap and a short Zap will be heard; the other sounds can be produced by replacing zap with step, siren, or explosion as required. This shows how easy it is to produce the new sounds from Basic. The machine code routine can be saved to cassette or microdrive by typing one of the following:
SAVE "sound m.c" CODE start,83 for

NEW-4QL

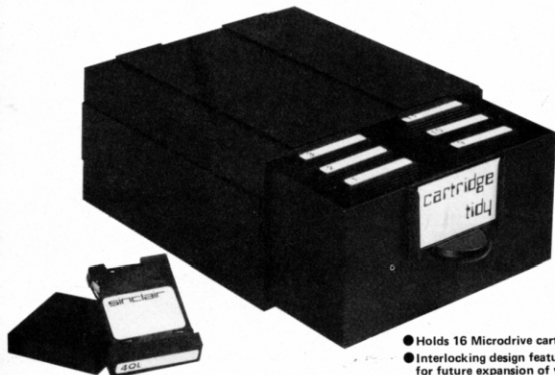


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cassette or
 SAVE "m";d;"sound m.c" CODE start,83
 for microdrive where d is the drive
 number.

Now make a note of the following
 addresses in a safe place.

	16K	48K
CLEAR	32499	65199
EXPLOSION	32500	65200
STEP	32537	65237
ZAP	32532	65232
SIREN	32560	65260

When you want to use the sound utility
 type the following:

CLEAR address: LOAD "sound m.c" CODE
 (address refers to the value in the table
 above).

The first line of a 48K program should be
 the following:

```
1 LET explosion = 65200: LET step = 65237:
LET zap=65232: LET siren=65260: REM
addresses for sound routines
```

The new sounds can be used at any time
 in your programs by typing RAND USR
 [sound required] as before.

For Z80 machine code users

Listing 2 shows the Z80 assembler listing
 for the sound routines which was written on
 the excellent Hisoft Gens assembler. The
 first routine is the explosion routine which
 outputs directly to the loudspeaker via port
 FE Hex.

The A register is first loaded with the
 border colour system variable. This is then
 rotated right three times and anded with
 07. This makes A contain the value for the
 current border colour which is then saved
 into the E register. HL is then made the top
 value of the stack which is used to point to
 random data. C is loaded with 0 and is used
 as a frequency counter (see later). D is
 loaded with the explosion length and A
 with a random number pointed to by HL.
 This random is then masked so that only
 the speaker bit (bit 4) is valid. The border
 colour is then added to A and this output to
 port FE. A delay dependent on C is then
 produced at lines 190 and 200 which
 controls the frequency of the explosion.
 This is repeated until the explosion length
 D (which is decremented each cycle) is
 zero, then the frequency is reduced and the
 program repeats again.

The Zap and Step routines are the same
 but with different values of frequency
 decrement. The ROM BEEP routine is
 used and the comments in the listing show
 how it works. The last routine is for the
 siren and is very similar to the zap and step
 one. The difference is that the sound is cut
 off before the frequency has reached zero.

Using these basic routines creates inter-
 esting effects; changing the initial condi-
 tions such as duration, frequency and
 frequency increment or decrement means
 a varied and extremely useful sound library
 can be built up.

LISTING 2

```

1 ;
2 ;Machine Code Sound Routines
3 ;Copyright Gavin Monk 1984.
4 ;
5 ;
6 ;
7530 10 SOUNDS ORG 30000 ;testing origin
20 ;
30 ;
40 ;
50 EXPLO LD A,(BORDCR)
60 RRA
70 RRA
80 RRA
90 AND 07 ;A;border colour attribute
100 POP HL
110 PUSH HL ;make HL top address on stack
LD E,A ;save border attribute
LD C,0 ;reset frequency counter
LD D,#0F ;explosion length
140 LOOP LD A,(HL) ;#random number
150 LOOP1 LD #00010000 ;loudspeaker
160 RND
170 ADD A,E ;add border attribute
180 OUT (#FE),A
190 LD B,C
200 LOOP2 DJNZ LOOP2 ;delay dependent on B
210 INC HL
220 DEC D
230 JR NZ,LOOP1
240 DEC C ;increase frequency
250 JR NZ,LOOP
260 RET
270 ;
280 ;
290 ;
300 ZAP LD BC,#10 ;decrement in frequency
310 JR SOUND
315 ;
320 ;
330 ;
340 STEP LD BC,#50 ;decrement in frequency
350 SOUND LD HL,#500 ;starting frequency
370 LOOP3 SEC HL,BC ;reduce frequency
LD DE,1 ;time
380 PUSH HL
390 PUSH BC
400 CALL BEEP
410 POP BC
420 POP HL
430 LD A,H
440 AND A ;check if frequency almost zero
450 JR NZ,LOOP3
460 RET
470 ;
480 ;
490 ;
500 SIREN LD BC,#350 ;end frequency
510 LD HL,#500 ;start frequency
520 LOOP4 LD DE,1 ;duration
DEC HL ;reduce frequency
530 PUSH HL
540 PUSH HL
550 PUSH BC
560 CALL BEEP
570 POP BC
580 POP HL
590 SBC HL,BC ;if not reached
600 POP HL ;end frequency
610 JR NZ,LOOP4 ;repeat
620 RET
630 ;
640 ;
650 ;
660 ;
670 ;
680 ;
690 ;
700 ;
710 ;
720 ;
730 ;
740 ;
750 ;
760 ;
770 ;
780 ;
790 ;
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810 ;
820 ;
830 ;
840 ;
850 ;
860 ;
870 ;
880 ;
890 ;
900 ;
910 ;
920 ;
930 ;
940 ;
950 ;
960 ;
970 ;
980 ;
990 ;
1000 BORDCR EQU #0C48 ;system variable
1010 BEEP EQU #03BC ;ROM routine
1020 BORDCR 0305
1030 EXPLO 7530
1040 LOOP1 753F
1050 LOOP2 753E
1060 SIREN 756C
1070 SOUNDS B1C5
1080 ZAP 7550
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9098 ;
9099 ;
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Tom Sato examines the invasion of Japanese disk drives and printers.

Peripheral chat



The Dragon twin drives use the Sony format.

Japanese disk drives and printers outsell the rest in Britain and the United States. Now Japanese peripherals are moving into other spheres. Indeed, some are already here in the shape of 3 and 3½ micro floppy disk drives.

Floppy disk drives

In Japan, more home micros mean more disk drives are wanted. The most recent micros have built-in disk drives.

Sony and NEC have both released 8-bit home micros with 3½ in disk drives. The disks hold about 140K and systems in Japan are relatively cheap at about ¥150,000 (£428).

The hugely popular MSX machines will also have 3 and 3½ in disk drives — National Panasonic's recent survey shows that the most desired peripheral for its MSX computer is a micro disk drive.

The micro floppy disk has various advantages over 5¼ in disks. For example, with the rigid plastic protection they are more robust than card-cased 5¼ in disks and can even be sent through the post. Also, the micro floppies' disk operating system is compatible with the standard 5¼ in floppy disk drives.



The 3½ in disks pop out at the push of a button.

At the moment a battle is raging in Japan between 3½ and 3 in micro floppy disks. 3½ in disk drives were developed by Sony and also used by NEC; 3 in drives were developed by the Hitachi group which includes Maxell, the magnetic tapes manu-

Many manufacturers are using the Japanese formats for their disk drives.



facturer. National Panasonic makes both.

The Sony and NEC 8-bit micros' 3½ in disk drives are built-in, but the only home micro with built-in 3 in Hitachi-type drives is the Sharp X1D.

Outside Japan Sony is certainly taking the lead. Apple's Macintosh has a Sony disk drive as standard and ACT's Apricot two built-in Sony disk drives. The Dragon also has a Sony system available from Premier Micro systems. Meanwhile, Hitachi's 3 in disk drive is popular with peripheral makers for the BBC: Opus, AMS and GCC sell them for around £200.

Micro floppies are underrated by micro users, possibly due to lack of software in this format, but this shouldn't be a problem because of their 5¼ in disk compatibility. In terms of performance, micro drives are just as good as 5¼ in disks. Opus, for example, boasts 588K (unformatted) on a single 3 in floppy and the Apricot Sony disks can hold 315K on a single side. The speed matches that of 5¼ in disks.

Just as 5¼ in disk drives replaced the 8 in drives, micro floppies could well become the standard for business as well as home use, as they are soon likely to be considerably cheaper than 5¼ in drives. Japanese manufacturers aim to produce micro floppy disk drives in particular to meet demand created by the MSX boom. Those disk drive manufacturers currently producing 5¼ in drives like Canon, Teac and Epson will doubtless join them. Perhaps we'll see the price of micro disk drives dropping towards the hundred pound mark by this time next year. The MSX machines in Japan cost about £188 and the disk drive won't sell unless it is cheaper than the micro itself.

Printers

Epson now makes 48 per cent of the world's printers. It has recently released a new version of the MP 130K printer called UP 130K. This incredible dot matrix printer can handle 288 characters per second in draft mode and can be set to Kanji mode (Chinese character mode vital for Japanese word processors) with 45cps and letter quality print. The export version (renamed LQ 1500) should soon appear in your local Epson dealer's windows. The letter quality mode runs at 65 cps but the machine will probably be more than £500.

Epson's printers are over £300, but sister company Seikosha's printers are all under £250. Seikosha provides cheap printers for computer manufacturers like Commodore. It has also teamed up with British distribution company DGR to market a range of printers compatible with various home micros such as the

Spectrum and Dragon.

Epson and Seikosha are owned by the giant watch maker Seiko. At first it looks silly to have two sister companies producing printers, but they cater for different needs, as is obvious when you compare their printers' prices.



The Seikosha GP-700A prints in seven colours.

The Epson printers' reliability is due to the 350-strong female work force at its Nagano factory. When Epson built its factory, it agreed with the local government to create more jobs for women. The women are trained to understand exactly how the printers work: they can spot a fault while making the machine and are skilled enough to repair them.

Some printer manufacturers are selling more than they can produce and so find it difficult to supply the British market. NEC for one is supplying printers for IBM and cannot make enough to export to Europe, with the result that the PC-8023 printer is still available in Britain although NEC now has a couple of new printers out in Japan.



One of Brother's ever expanding range of printers.

Meanwhile smaller companies such as Shinwa, Star and Brother, who have just entered the European market, should do well. Less well known in Japan, they produce machines specifically designed to sell in Britain. They are also able to offer low prices. However the price of a standard printer, say with 100 cps, bidirectional logic and high-resolution graphics, is unlikely to fall below £200, partly because of the strong Japanese yen and because Japanese manufacturers feel they are cheap enough already.

However, it all adds up to cheaper and more varied Japanese peripherals for your micros in the coming year.

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DRAGON POWER

A first-class operating system for Richard King's Dragon 64.

The OS9 operating system offers the Dragon 64 owner the taste of a professional system for a hobbyist's price. The facilities offered by OS9 put it up with the leaders of the first division of operating systems, such as Unix.

Software support

Commodore's CP/M for the CBM64 (PCN issue 59) is, for the moment anyway, a non-starter due to the machine's lack of software, and CP/M doesn't offer half the facilities of OS9.

In contrast, Dragon Data's OS9 is supported by a wide variety of applications programs such as a word processor (replete with a 40,000 word spelling checker and Mailmerge), spreadsheet, stock recording, record management system and so on. You can also get a C compiler, an extremely extended Basic (Basic (99) and Pascal. A complete software suite in effect.

Features

The system offers multi-user support, multi-tasking, hierarchical directories, passwords, pipes, filters, fore- and background processes with variable run-time priority and just about every other facility you might expect to find on a decent minicomputer. There's also device-independent input/output with interrupts, re-entrant code and common-use modules.

'Hierarchical directories' are files with lists of other files in them. This allows you to group related files together; you could, for example have all your letters in one file, or a file containing a list of groups of correspondence, each of which contained common letters such as personal, business, notes etc.

However, while hierarchy is useful with a Winchester (because not all the file names appeared on-screen at the same time) it's of small practical value on the Dragon 64 due to the limited disk space.

Multi-tasking has the Dragon do several things at once. Unfortunately, the Dragon doesn't have multiple input lines, so the multi-user aspect of OS9 is not available.

Re-entrant code and modularity? Use-

ful if you want to use the same piece of code to do two or more different tasks. The code stays the same and a copy of the data from each calling program is stored, so each variation on the operation is kept separate.

Device-independent I/O makes it easy to send the output of a program to the screen, a printer, another computer, a disk file, or any other device — OS9 handles them all. Making it interruptible lets important but rare events grab the processor's attention for the short time needed to handle the situation without losing track of other tasks.

OS9 comes with a command file called GOS1. This loads a screen driver which gives a display of 16x51, a major improvement over the normal resolution of 16x32 and GOS1 gives you lower case. However, using the larger screen takes an extra 6K of RAM.

In use

When you use OS9 you're dealing with the 'shell' of the system. This links you to the 'kernel', which is the process controlling the hardware.

OS9 is not the friendliest of operating systems. There are literally dozens of symbols and learning their meanings is a slow process. You don't get nice menus and such-like, just the prompt 'OS9:' and everything you enter to this is interpreted.

OS9 commands have the syntax <Command>/<Device Number>/<Directory>/<File Name>. If you wanted to look at the error messages you

might enter LIST/D0/SYS/ERRMSG. Change this to LIST/D0/SYS/ERRMSG/P & DIR/D0/CMDS and not only will the error messages be sent to a printer, but a list of the files in the CMDS directory will be displayed.

Errors produce a number and a message, the most common for the first time user being 'Pathname Not Found'. It gets tricky remembering the names of directories you've created using MAKDIR.

OS9 takes some 20 seconds to bootstrap itself from cold, then you have to enter the date and time (files are date stamped).

OS9 with Dragon Data's disk drives is curiously slow. The 6809 is generally reckoned to be the fastest 8-bit processor and there's a 40-pin VLSI chip which should be pretty nippy about sending signals.

Another problem is memory. OS9 provides some clever mechanisms for making the best use of available RAM. However, the Dragon's limited to 64K, of which some half to one-third is used by the shell, kernel, disk buffers and the like. This means multi-tasking may not really offer much time-saving; most programs need data and from a rough calculation, a program of 10K with an array of 100 records by 200 characters will only just fit in RAM. Even assuming the data is on disk, accessing this will create bottlenecks.

That said, where else can you get a 'real' operating system on a home micro? With OS9 Dragon 32 owners can upgrade to the 64, and for not too much extra get programs to match professional ones (ie CP/M).

Verdict

Dragon Data has come up with a strange animal. While OS9 offers facilities normally associated with minis for a low price, it's badly hampered by its slow speed and restricted memory environment. However, it would suit anyone who could benefit from getting to grips with a Unix-like system.

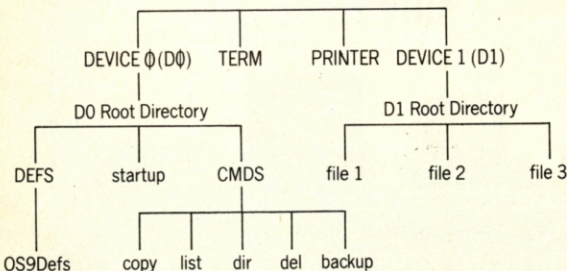
Rating (15)

Features
Performance
Documentation
Reliability
Ease of use
Overall value



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Clare Gurton looks at some recent educational software, in particular an aid to studying Shakespeare.

Spectrum scholars



Shakespeare's *Macbeth* is among Penguin's newly-launched Study Software series featuring programs written by teachers to give CSE and O-level students the ability to study Shakespeare's plays 'by means previously impossible' — an impressive claim.

Documentation

The documentation is sparse, as it's assumed you'll have a Penguin edition of the play to hand. The illustration from the cassette cover and there are a few hints on how to use it.

Getting started

While the program loads, two title screens appear — the Penguin logo, and the illustration from the cassette cover.

The program allows you to select themes and characters from the play and will search its database for relevant references. You can choose from seven characters and 24 themes. But you're limited to a maximum of three items, so you could search under one character and two themes, or vice versa. A search can be limited to a single act or the whole play.

The simple single-key commands are easy to use and you can exit any process at will.

In use

During a search the screen is split into windows. You're reminded of the search topics, given a reference and a comment for each 'find'. Other themes or characters



Pick single items to be studied in depth

for consideration may appear where relevant.

I decided to select *Macbeth* with the theme of prophecy. The first screen referred me to Act 1, Scene 3, line 50 — a little difficult to find when you're not using the Penguin text. I spent ages counting lines without knowing whether I was looking at the right quotation.

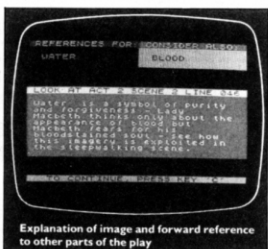
For the first 'find' the program asked: 'Have the witches in their prophecy spoken *Macbeth's* secret ambition?' There are no easy answers in this study pack; the statements provided are thought-provoking, not simple cribs.

At the end of a search you're given the number of references found in each act and a total. If your search has come up with nothing, it's politely suggested that you may be searching under combinations that will not help your understanding of the play.

Verdict

The program has been given plenty of thought and the authors have chosen the most important characters and themes from the play.

However, I was annoyed at having to



Explanation of image and forward reference to other parts of the play

look from book to screen; if only the relevant lines had been displayed.

It's a great pity there's no option for printing the results of searches. Many of these might have been of value as revision notes and essay plans.

Also, the program would be of no use to students unfamiliar with the text who could spend too much time searching irrelevant combinations. Less talented students might find some of the statements confusing rather than helpful.

The program may offer an unusual way of studying Shakespeare, but to get the most out of it students really do need guidance, from either teachers or a good study text.

Penguin's Shakespeare doesn't really live up to its more exaggerated claims but is an interesting use of micros in education.

Diligent duo

From Amazing Games comes 1984, an O-level revision package for George Orwell's novel. The program gives three out of four ways of revising the text with main menu offerings being: three example essays; plot summary; notes on the text; and quit.

Once you've chosen one of these, you have to load data. The instructions tell you to rewind the tape, press play and 'be patient'... you have to be.

There's a choice of three exercises: discussion essay, an essay requiring many references from the text, and tracing one main theme throughout the text.

The plot summary examines each chapter's plot in relation to its contents. 'Notes on the Text' is a glossary of the words and phrases of 'Newspeak'; themes from the book such as Winston's ulcer are also explained.

Some of the information in this program could be useful for O-level candidates, but it would be so much easier and quicker in book form.



Cargo, from Sinclair and Macmillan, is a well-produced package in the Science Horizons series. It has the advantage of a readable booklet covering the program's use as a model and background information. All perhaps a little

daunting for younger users, however. You have to load and sail a cargo ship. Points are scored for the safe delivery of cargo. You can choose ranks such as cadet or chief officer and the ports you wish to visit during the game.

The screens are generally very good but the one for loading is complicated and requires you to have read the booklet first.

Once sailing, all sorts of mishaps can occur, assuming you've managed to evenly load the cargo on to the ship to start with. High seas, gales and water salinity combine to make safe sailing hazardous. To survive mishaps, you must learn the principles of loading up, planning a safe journey, the importance of the Pimsloll line and so on.

This is a good example of a game where learning is incidental, but will undoubtedly occur, and in this respect it holds advantages over run-of-the-mill formal practice programs.

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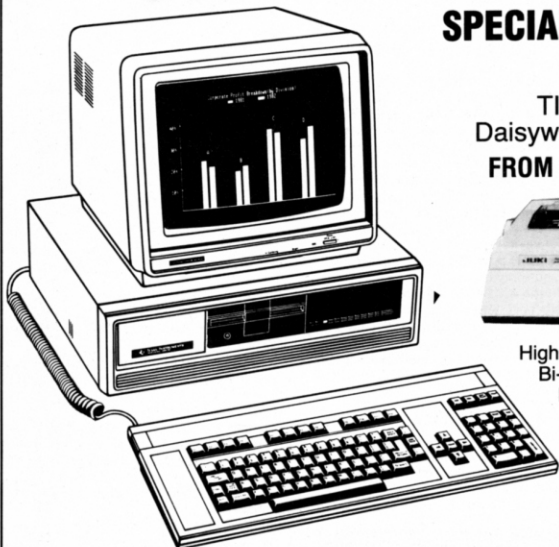
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DATA EXPRESS

Expressbase II streamlines your database no end, says Neville Ash.

DBase II is not only the database system by which all others seem to be judged, but has also become the heart of a whole industry producing software either to make dBase easier to use or to extend its possibilities.

The industry around dBase has included programs like Quickcode from Fox and Geller, and Autocode from Stemmos. These give a useful and fairly friendly front end to dBase and recently Ashton Tate itself has joined the rush by producing Friday! The latter is certainly easier to use than a naked dBase, but nothing like as sophisticated. Then we have the latest version of dBase, version 2.4, which has an extensive tutorial, various extra help facilities and is a major improvement on the first issue. So how does a new package like Expressbase II fit into the picture?

Features

Expressbase II is designed for professional programmers to increase productivity and hence cut the costs of program development.

Expressbase allows you to create dBase programs using a normal word processor like Wordstar, and of course it can be used with version 2.4's powerful Modify command, which is itself a fair text editor.

Once a program has been constructed and typed in, the text file can be read by Expressbase. The advantage is that in the text file, repetitive dBase commands can be abbreviated, as can screen messages and user commands. Expressbase lets you use single or multi-line statements or commands and programs can be processed sequentially, up to 250 per run, giving a sort of batch facility. Of course, it also allows you to code dBase programs in sections, thus encouraging a structured approach.

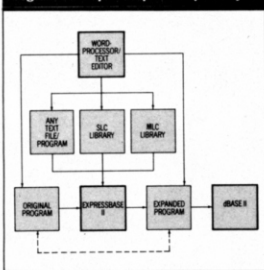
Its real advantages won't be seen until a large number of programs have to be created in a short time. Then, users can simply hack in their dBase programs, complete with Expressbase abbreviations and have Expressbase II convert the text file into proper dBase code for running under dBase II.

Documentation

The spiral-bound manual explains how Expressbase works, the abbreviated commands, how to select specific phrases, dot commands, automatic indentation, batch processing and so on. It also deals with specifications, cost savings and error messages.

The manual is clearly written and examples are given, but there's no index. This is a common failing of software manuals and one that could — and should — be remedied.

Program development: possible pathways



In use

Due to its nature, when you use Expressbase you actually start long before you even load the program because you first have to write a program with a text-editor. Alternatively, you could use Expressbase's MLC or SLC (Multi/Single Line Command Library). The SLC library is a text file you can set up containing expressions you find yourself using regularly. Its greatest value is for storing repetitive lines of text. The MLC library can be used in a similar way, but you can set up short routines such as a loop to collect an input, then perform some simple validation on it. There are four entries supplied in the SLC library, 11 in MLC, and you can overwrite these with your own entries.

In a similar vein, there's a date test function which can be called up with just a single line command. You could add a routine into the MLC to calculate the days between two dates.

There's a useful abbreviation for the SAY and GET functions in dBase. A program line such as @. S.D. 6.16,DESC,SERIALNO,SUPPCODE . . . replaces the dBase code for @ 6.16 SAY DESC:@.8,16 SAY SERIALNO:@ 10,16 SAY SUPPCODE and so on. REPLACE can be dealt with in much the same way.

Once the text file has been written and saved to disk, you can load Expressbase itself by entering EBASE, together with a prefix according to whether you're using a CP/M, MSDOS, PCDOS or CP/M-86 system.

Abbreviated commands in Expressbase include C for 'clear', SI for 'set index to', and . (period). Since these sorts of commands are the ones which occur most frequently in dBase programs, cutting them down saves entry time.

Abbreviations extend to screen options, acceptance messages, memory variables

and a range of miscellaneous commands.

One problem is that a program written using all possible condensed forms of dBase commands is virtually unreadable. eg DC Fo RA RT Fi DO THIS . . . replaces lines like:
DO CASE
CASE MFUNCTION = ''
RELEASE ALL
RETURN
CASE MFUNCTION = 'C'
DO THIS

The menus are clear and from the type of information supplied, it's obvious that the program is really intended for the programmer who's thoroughly familiar with dBase already but needs some way of cutting down on the tedious chore of entering programs. First time or novice users will find little or no use for Expressbase. dBase 2.4's tutorial disk, or a menu driven program generator such as Autocode would be more suitable.

There are ten sample programs in the manual to allow you to check Salamanca's claims about time saving and performance statistics. The programs contain more than 354 lines of Expressbase code which would be expanded to 559 dBase lines with some 7447 characters added. Now, if we assume programmers earn a minimum of £10 an hour, and can type at a rate of one character per second, that's a saving of £20 over a very small piece of coding. Incidentally, Expressbase only takes some 15 seconds to add those 7447 characters.

To save time I found it easier to set up an EXEC file under PCDOS and I couldn't crash Expressbase no matter what ridiculous things I tried. However, I did at one point get dumped back into the operating system with no explanation after typing Control-C.

Verdict

There doesn't appear to be any direct competition to Expressbase apart, perhaps, from Fastbase which generates dBase command files and does a similar, though not identical, job of making dBase code faster to write. However, Fastbase is more expensive and not available under so many operating systems as Expressbase.

While Expressbase could show savings and takes some of the tedium out of entering dBase II code, it's not really relevant to users who don't have an awful lot of entry to do. But for the professional programmer, or for a large-scale project it might prove useful.

PCN

RATING (/5)

Features
Documentation
Performance
Usability
Reliability
Overall value



Name Expressbase II Price £120 Publisher Salamanca Software, 64 More Close, St Paul's Court, London W14 9BN 01-741 8632 Format Disk Versions CP/M, CP/M-86, MSDOS, PCDOS Distributor Software Ltd 01-833 1173 Outlets Selected dealers.

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Compaq compatability

The IBM-compatible and portable Compaq wins Richard King's commendation.



It seems a long time since the Compaq was first announced, but finally it's here. The product is one of the highly-imitable 'sewing-machine' variety of 'portable' micros, and in this case, a particularly well-finished example of the breed.

The Compaq has been so well-covered in the press that it hardly bears repeating but it's 'IBM-compatible'. 'IBM compatibility' is a term often stretched out of all recognition by the publicity people but as far as I can tell the Compaq is truly compatible.

Documentation

Though the machine itself is well-made, it's obvious that as much, or even more, care was expended on the documentation. Frankly, the machine-specific part is among the best I've ever seen. The operations manual is in the form of an A5 three-ring binder in a slip-case, which is divided into twelve sections by stiff separators with indexing-tabs.

The first part is called 'Getting Acquainted'... a very good place to start.

Opening the machine, setting it up and booting are explained step-by-step. DOS operations come next, covering most aspects and though there is a tendency to repetition in this section, this isn't a bad thing.

Basic, how to terminate a session, user diagnostics, and options are also covered, and the back is filled up with four appendices: a summary of DOS commands, notes on compatibility, a glossary, and the index plus some user-response cards.



Left: the hatch at the rear left side reveals the fan exhaust and power socket. There is also space to hold the power lead and a UK-standard plug.

Below: removing the top cover reveals only the solid metal housing which contributes much to the Compaq's robust construction and not a little to its weight. There is no easy access to the insides of the machine so do-it-yourself maintenance is ruled out.



Appendix B details the main differences between Compaq and IBM. Principally, the Compaq's Basic is completely disk-based, whereas the PC has part in ROM. The PC can have up to four drives, and the Compaq only two, but the graphics are built-in, none of which should affect the ordinary user.

There are two other manuals which come with the Compaq: one is the MSDOS 2.0 reference and the other is the Basic 2.0 guide. These are, apart from the outer covers, pretty standard. Dull, not always as clear as they might be, but complete for all that.

Construction

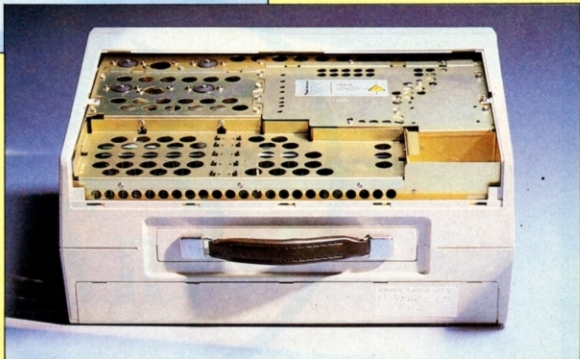
I don't know whether the engineer who designed the Compaq has some experience in aircraft-design, but I strongly suspect so. Certainly the insides bear a very close resemblance to the bits you're occasionally privileged to see when your flight can't leave because the aeroplane won't go.

When it's folded up, the Compaq looks just like a sewing-machine with a rather expensive handle. The case appears to be reasonably tough, but I don't think it's quite tough enough to go in the baggage-hold — though it should fit under your seat anyway.

Unfolding it involves turning it on one side to slip the catches on the keyboard, revealing a small monochrome screen on the left, and two 5/4in drives mounted vertically on the other side, each of which can store a respectable 360K. In use, this is effectively the equivalent of some 60,000 words of text... enough for all but the very largest files.

It has a pair of little legs which flip out from the bottom to give a (very mild) incline to the main unit, and a similar pair on the keyboard.

At each side is a sliding hatch. Behind one is the power-socket and switch with space to hold the card and a British plug, and behind the other are the various I/O connections. You are enjoined to keep both open whenever the machine is in use, since that's where the fan exhausts.



Behind the right-hand panel are various I/O connectors, plus blanked-out positions for several more. Those provided include a parallel printer port suitable for driving a printer (Centronics standard), and three video outputs. These aren't just extra connectors, but provide three different signal-types... RGB for connection to a high-resolution colour monitor, as well as composite video and TV signals.

More intimate access to the machine is through the top panel, which can be entered off by judicious use of a narrow-bladed screwdriver.

It became quite obvious, at this point, that the machine is not user-serviceable, and any maintenance or upgrading is to be carried out by trained personnel.

The chassis certainly looks and feels solid enough to take any reasonable — or moderately unreasonable — amount of handling.

The machine runs the 8088 pseudo-16-bit processor and 265K of RAM, but I can't say whether there are any fancy chips or ULAs in there, nor whether there is any provision for such enhancements as the 8087 maths-processor. The documentation doesn't help as there aren't any circuit diagrams nor proper specifications included, though since the machine is aimed at people who are not expected to have an interest in this area, this isn't surprising.

The machine is expandable, and as

mentioned above, the natural addition is some form of communications facility, and since this requires only a few chips, the remainder of the space could be taken up with memory. An ideal candidate for this would be one of the multi-function cards so often purchased by PC-owners, such as the Six-Shooter from Quib, which has one parallel and one serial port, gives memory-expansion in 64K blocks from 64K to 384K (the latter taking the machine up to the maximum possible of 640K), as well as a clock-calendar. Other companies also offer similar boards, and thanks to the 'ultra-compatibility' of the Compaq, you can be sure that they will work exactly as intended.

Keyboard

The keyboard isn't an exact duplicate of the IBM keyboard, but having ten programmable function keys on the left-hand side, a normal qwerty layout in the centre, and a numeric keypad coupled with cursor controls on the right, it's pretty close, and unless you have the two side-by-side, it's hard to spot any differences.

It's claimed that the feel is better, without the clicky feel of the IBM keyboard but I don't think it matters much. The keyboard on the Compaq is as good as most, with no glaring bad habits except a very strong elastic property in the coiled cable.

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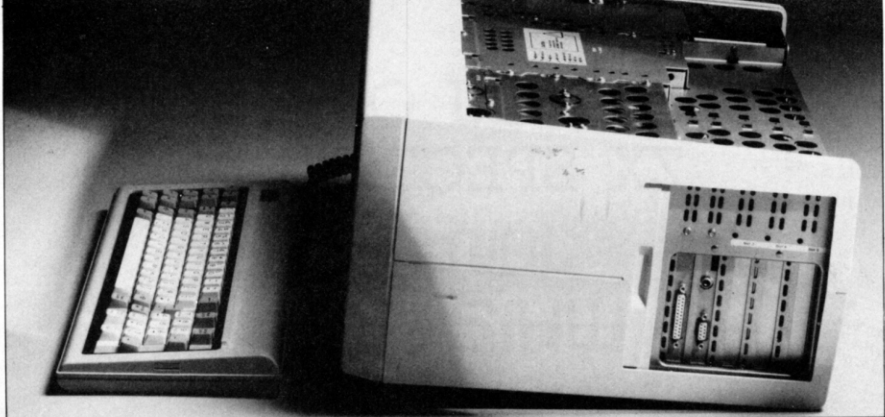
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The rear right hatch covers the Centronics and video sockets, plus slots for three expansion cards.

Display

◀ 33 The built-in screen is 9in across the diagonal, larger than some other luggables, displays 80 columns of 25 lines, is good and sharp and has a green phosphor with a fairly long persistence which leads to some interesting ghosting effects in the demos which come on the master disk. These caused me some problem, since they suggested that some highly original smooth-scrolling full-screen editor was available, as well as windowing.

The demos, which are very impressive, suggest various uses for the machine, one of which is writing. To show this off, a small two-stanza 'poem' is constructed on the screen, chopped up, rearranged on neat diagonal moves and edited, changing it from two lines of prose to two stanzas of about eight lines, centre-justified.

Don't be misled, as I was, into thinking that this is available to you... it isn't. It's just a very sophisticated demo to illustrate the point, not a real editor. I wish it were, though.

Among the other screen-based features of the machine are high-resolution graphics and programmable characters, and these too are well demonstrated. In fact, it's possible to produce some quite fancy gaming-pieces.

In use

From the style of the operations manual, it's evident that this machine is aimed at the non-technical user, so how well does it satisfy those needs?

In this instance the hardware is relatively

unimportant. It conforms closely enough to the IBM standards to accept virtually any hardware or software for the real thing, and provided the disks go round reliably and the screen displays the expected results, all is well.

Hundreds, possibly thousands of different or not so different programs are available, ranging from programming languages, accounting suites, filers, editors, as well as more entertaining ones like the Microsoft Flight Simulator, and it's the machine's ability to cope with this particular program, which requires the presence of some quite minor features only found on IBM PCs and close relations, which proves that the claim of almost total compatibility is perfectly justified.

So you can be quite confident that any program which you've seen demonstrated on an IBM will operate quite happily on the Compaq. In general, of course, you'll be using less demanding programs such as Wordstar or either of the Easy Writers for an editor, Lotus 1-2-3 or a selection of Visi-progs for spreadsheet and graph-drawing, dBase II for filing, and so on.

Verdict

The Compaq is as tough and well-made a machine as I've seen for some time, and it's obvious that the company has made considerable efforts. The price is reasonable, and it's a good usable machine, at a price which should make it a very serious competitor to the PC Portable, or even the PC itself, particularly since it's almost exactly the same thing.

PCN

Crux of compatibility

When it comes down to it, the acid test of an IBM compatible is its ability to run IBM software and, to a lesser extent, to accept IBM peripherals. On top of this you have to consider factors like ease of use and price.

The Compaq comes through the first test with flying colours. It happily ran the software PCN's real IBM runs, and spat on the Wordstar disk PCN's IBM spits on. It will accommodate one of the widest ranges of IBM software and hardware of any of the PC clones.

As far as actually using it is concerned, the attraction seems to be less one of transportability than of compactness. To get it up and running, all you do is snap open the catches holding the keyboard/base onto the fascia, pull out the legs on the keyboard and the main console, then slide back the hatches that cover the power input and the interfaces.

Overall it's pleasant to use, salient differences being that the review machine's drives made a slight clunk clunk noise (drive a) and a whinging noise (drive b). This is marginally less disturbing than the characteristic gronk gronk of the IBM PC's drives. The speaker is slightly louder than the PC's and the keyboard considerably springier. I wasn't too keen on this last feature, and it might have been better to change the keyboard layout, although this really depends on how used you are to the standard IBM keyboard.

Under normal office lighting conditions the screen is excellent, but the high definition has been achieved at a cost. If you use it in dim ambient light you'll encounter particularly bad ghosting problems and will be forced to train a light onto it.

Is it worth the money? The answer is a qualified yes. The price of IBM-style machines is high, but given that any one of them is worth the money, the Compaq is certainly in with a very loud shout.

John Lettice

SPECIFICATION

Price	£2,195
Processor	8088
RAM	256K
Text screen	80x25
Graphics screen	640x200
Keyboard	Detachable, full travel with 10 function keys and numeric keypad
Interfaces	Centronics, RGB and composite video
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Bring on the buggies

Two 'buggies' for the very young upwards impressed Victor O'Neil.

Every child should have the right to two things — a granny, and a micro'. So says educationalist Tom Stonier, Professor of Science and Society at the University of Bradford. We can all relate to grannies, but how do schoolchildren relate to micros?

Seymour Papert, in his book *'Mindstorms — Children, Computers, and Powerful Ideas'* had a lot to say on the subject. Children need not relate to micro in the same way they relate to granny, the micro is merely a tool with which children may teach themselves.

Central to Papert's revolutionary ideas on education (using computers) are two things. One is the programming language Logo, developed by him and others in the early '70s, and the other is the turtle.

Turtles are objects which move under the control of a user, and its simplest form is a cursor on the screen. However, the impact on a young child is far greater if the turtle is something less abstract. Hence the development of robots.

It is now over a year since *Economicist's BBC Buggy* first appeared. The prototype was built by Mike Bostock, the Microelectronics Education in Primary School's Technology Manager, using Lego parts. 'Everyone wants to build a robot', he was quoted as saying at the time, 'and at the age of 33 I finally built one'.

K1 Buggy

Some people aren't prepared to wait so long, and 16-year-old Mike Leppard of Southbourne in Hampshire has built a turtle-like robot for the BBC in his own home. The buggy is called the K1 (what's he going to call the ninth?), and comes with all the electronics enclosed in a sturdy grey moulded polystyrene box, about 7in x 4in x 3in.

The buggy shows that anyone with enough determination could build a buggy like this for themselves. Mike Leppard has the resources to put the buggy into

PCN PRO-TEST PERIPHERALS

production if the demand is great enough, and plans to use the help of his family to get them built.

When the buggy becomes available Mike Leppard expects it to cost about £95, half the price of the BBC-Buggy and at this price it compares favourably. Unlike the BBC version it would be supplied fully assembled, allowing you to enter the world of robotics two and a half hours earlier than you would with the BBC.

Like the BBC Buggy, K1 is propelled by two wheels, each with a forward/reverse motor. There are bumpers on each corner with microswitches that tell you when you've hit something. On the front face there's a light dependent resistor (LDR) and underneath is a small lamp with a light sensor on either side.

A pen slots in at the centre of rotation. This is attached to a solenoid, allowing the pen to move up and down for drawing. However, K1 can be used as a Logo-style turtle — not as accurate as a dedicated turtle but much cheaper.

A suite of programs demonstrates some of K1's capabilities. The first program, Drive, uses the cursor keys to direct the buggy. The next, Draw, was an enhancement of this, with PEN-UP and PEN-DOWN commands. Others memorise and repeat a route, seek out a light source and follow a black line drawn on a white surface.

Youngtrainer Buggy

Another robot-style attachment for the BBC also appeared recently: the Youngtrainer Buggy from Northern Computers (Issue 60). This is a simpler device, aimed at a different market — part of a kit designed to teach concepts of systems control by computer.

The Youngtrainer itself is a box which plugs into the user port of the BBC, and contains a collection of switches, LEDs and relays. A comprehensive instruction manual takes you through a series of exercises which develop progressively more complex control and response pro-

grams. These use the Youngtrainer as its input and output.

The buggy is controlled via the Youngtrainer, using relays to switch its two motors on and off and to reverse direction. It looks rather skeletal, consisting of nothing more than two driving wheels, a castor, a battery box (for four HP11 batteries) and a front-mounted microswitch — the collision sensor.

Other sensors may be mounted on the buggy and connected to the Youngtrainer box, or directly to the BBC. For instance, you can add LDRs to seek out light sources, or microphones to seek out sound. These can be read from the analog port of the BBC using ADVL.

The Youngtrainer makes teaching and understanding the principles of computer control technology both easier and more fun.

Verdict

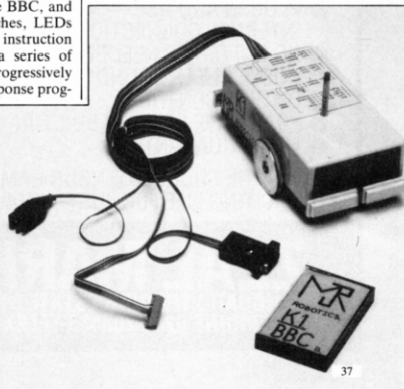
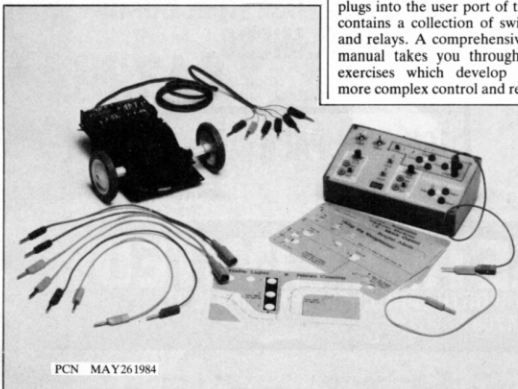
Buggies can't really be called 'robots' as long as they retain the umbilical attachment to Mother Computer, and they're certainly a long way off replacing Jeeves. But they're great fun and once you see them running about under your control it's difficult not to be enthusiastic.

If Mike Leppard can make K1 into a viable commercial proposition there's no reason why every child shouldn't have a buggy as well as a granny and a micro.

The Youngtrainer is a well-designed package which would improve any Computer Studies course. Versions of it are available for the BBC Model B, Commodore Pet, Research Machines 380Z, TRS-80, ZX81 and Spectrum. PCN

Product K1 Buggy Price Expected to be £95
Manufacturer Mike Leppard, 21 Eastfield Close, Southbourne, Emsworth, Hants, (02434) 3787

Product Youngtrainer, including buggy Price £125.50 inc. VAT
Manufacturer Northern Computers, Churchfield Road, Frodsham, Cheshire (0928) 35110



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FINGER PAINTING

Piers Letcher finds a Koala pad a bear essential for colour graphics.

New graphics packages and ways to use them have been overshadowed by the spotlight on the Macintosh and its MacPaint program.

But though out of the limelight there's much of interest in these products, such as in the new graphics tablet for the Commodore 64 which has just arrived from the US. Made by Koala Technologies, and distributed here by Audiogenic, the Koala package includes cartridge or disk software, and costs £80 or £90, depending on which version you choose. There are versions for the Atari, Apple and IBM, too.

First impressions

The red and yellow box and pamphlet are certainly eye catching, while the pad itself is in dull computer off-white and black. It's robust, with a slanted front for a better drawing angle and two buttons above the main pad for control keys; these perform the same function but enable the pad to be used left or right handed.

A lead from the pad plugs into the first joystick port on the 64. The pad comes with what looks like a black pencil, but is actually a hard plastic stylus, which is the first choice you have for a drawing instrument.

PCN was supplied with a cartridge version so getting under way took only about a minute and was problem free.

Features

Most features are apparent from the menu. This lets you select 17 functions, 8 brush shapes, and any one of 16 colours or 16 shaded patterns, all without using the keyboard.

The drawing functions include lines, circles, boxes, disks, frames, and rays, as well as free-hand drawing. Other commands include fill, copy, transfer colour, mirror and zoom. The latter can be used for editing the picture after it's finished, pixel by pixel.

Storage of pictures on both the cartridge and disk versions is straight to disk, and fairly fast, but it would have been useful if the package had been extended to cassette. As it stands, you need to be a disk owner whichever version you buy.

The grid patterns selectable from the colour palette are attractive, although the number of colours available is not as great as on the Atari Touch Tablet — but in the main the 64 does not have the colour capability of the Atari.

Documentation

Two red and yellow pamphlets come with the Koala. A thin one describes the hardware, and a more solid one describes the software. These are excellent, and set a good example to other manufacturers.



Koala creations

In use

Although the pad is designed to be used with the stylus provided you can draw with your fingers, effectively and accurately. Other drawing implements work too, but I would not recommend using anything too large.

The pad's surface seemed robust and showed no real signs of wear after several days of heavy use. Tracing was possible, with the zoom function being used extensively afterwards to correct slips of the pen or finger.

And you don't need to be a creative genius to enjoy this bit of kit since you can have fun experimenting without the fear of having your mistakes recorded — though each result can be filed away on disk if you want to keep it.

Perhaps the best painting that came from the pad was a friend's imitation of a Mondrian — all straight lines and rectangles of colour. Balancing these is simple when you can move the lines and blocks where you want, and try them in various places.

Some of the functions were a little shaky, in particular large circles or boxes, but this is only to be expected. And the fill was slower than I would have thought necessary — not so slow as to irritate, but slow enough to make you wait.

Verdict

Without the software supplied this package would be hard to use effectively. But with it, it's fun to use, and simple. The question remains, however, of just how useful such devices and packages really are.

Certainly, as printer technology advances the results can be moved from screen to paper and so many will have applications in design. At the moment only really high-resolution machines can do this. So, Koala remains in the league of peripherals that are immense fun to use but of little practical use. But, for my money, there's nothing wrong with that.

PCN

Product Koala pad and Koala painter **Price** £79.95—disk version, £89.95—cartridge version (inc. VAT) **Manufacturer** Koala technologies Inc. **Distributor** Audiogenic, 34-36 Crown St., Reading, Tel: 0734 586334. **Other versions** Apple II, IBM, Atari.



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Language vs. BC.

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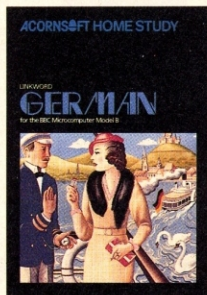
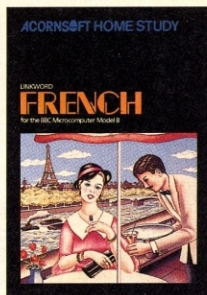
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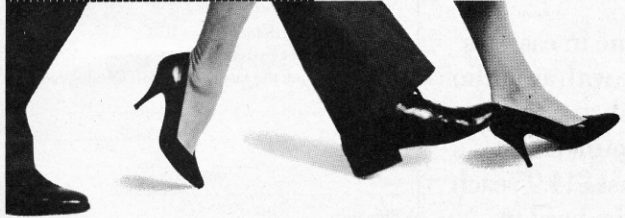
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PRE-VIEW

SOFTWARE

WHAT'S NEW • WHAT'S NEW • WHAT'S NEW



Note to software publishers: If you wish your company's product to be included, please send only the very latest releases to Bryan Skinner, PCN, Software Editor, 62 Oxford Street, London W1A 2HG; and please don't forget to include prices and a telephone number.

GAMES

Microdeal pulled out all the stops by releasing ten games for different machines. Commodore 64 owners can now experience the delights of the *Cuthbert* range and all the 64 games are available on disk at £9.95.

Danger Ranger, a fairly new Dragon game, is now available for the Atari, and Microdeal has covered the Oric, Atari and Electron with *Arena 3000*.

Also prolific, though not necessarily brand new, is the range under the US Gold banner. The company aims to bring the best of American software to Britain at low prices. Some of the more interesting packages include *Solo Flight* from Microprose, *Pooyan* from Datasoft (reviewed on the Atari, issue 34),

Beach Head and *Zaxxon*. *Beach Head* was nominated by the American magazine *Billboard* as the best game ever for the 64. *Solo Flight* may not be in the same league as *Sub-Logic's* *Flight Simulator 2*, but costs much less.

Oddest title of the week has to go to *Vision's* *Revenge of the Killer Tomatoes* for the Spectrum. This is a well-written machine code game in which you, as Smiffy the apprentice gardener, have to pick weeds growing in the cabbage patch to earn your keep. One problem is that the serried rows of cabbages move up and down the screen, treading on one means an instant wage deduction and the killer tomatoes will try to get you. It's not an easy game, but somehow lacks that addictive quality necessary for a winner.

Chess on micros is becoming quite the rage. *Chessmaster* for the Spectrum (64 soon) was written by Tony Miles who is one of Britain's leading chess players. The package is a chess tutor and comes with three

tapes, two of which provide commentary on the many games provided.

It's competition time with the Spectrum game *Carnival*. *Eclipse* are offering the £140 Grafpad drawing tablet as the prize for cracking the game and the competition response coupon on the inlay gives you a £26 discount on this neat piece of hardware.

UTILITIES

The most interesting package had to be Oxford Computer System's *Pascal* for the Commodore 64. A novel feature of the package is the RAM-based compiler which you can deal with interactively. This allows you to get to grips with the language before progressing to the disk-based compiler.

CP Software has extended its range of Spectrum utilities.

Supercode provides a hundred relocatable machine code routines including a flexible Renumber, On Break Goto, Block Moves, as well as a host of special effects like high resolu-

tion scroll to left, right, up, down, diagonal and many others.

Also of interest is a floating point *Forth* with a number of Spectrum-specific words, which should allow users to create fast games while learning a version of *Forth*.

The first program on Microdrive to reach us is Prosign's *Basic +*. This added structure *Basic* commands like REPEAT UNTIL, adds an ELSE IF... THEN statements, as well as providing three PROC function words for procedure definition and calling, very nice.

Going up-market to the (double resolution) Apple, Penguin Software is continuing its graphics emphasis. The *Graphics Magician Picture Painter* will soon be available for the Macintosh, Atari, Commodore 64 and IBM PC. An unusual aspect is that you can transfer pictures from the Apple to the Atari via joystick ports. A *Graphics Magician Animator* is also available to bring your images to life. PCN

APPLE

The Graphics Magician	\$39.95	Penguin Software 312 232 1984 (Geneva)
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VIC 20

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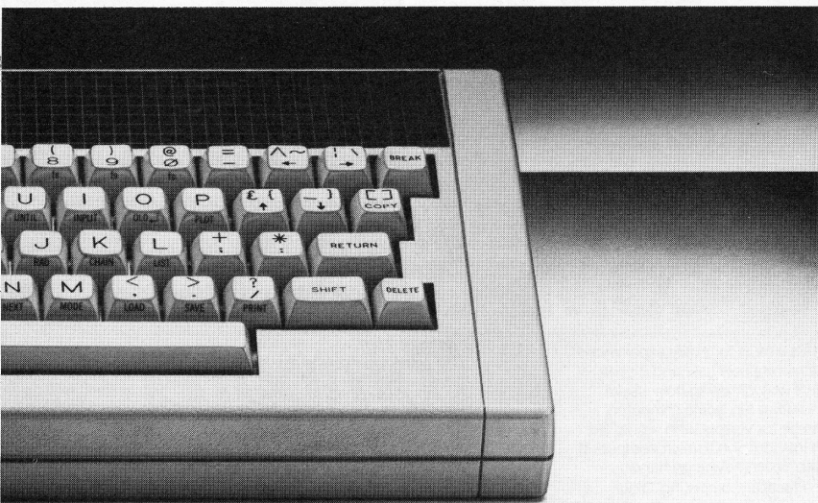
Of course it's not surprising that it's proving to be so popular.



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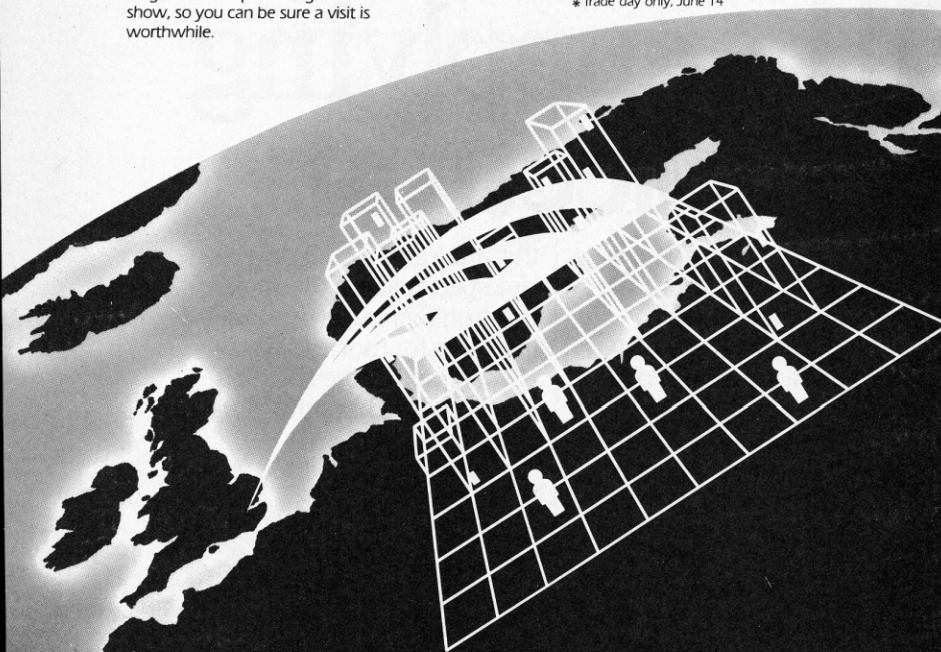
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SPECTRUM

Jeepers creepers

Name Rapedes **System** Spectrum
Price £5.95 **Publisher** Visions, 1
 Felgate Mews, Studland St,
 London W6 **Format** Cassette
Language Basic **Other versions** None
Outlets Mail order/retail.

Sub-titled *The Centipede's Revenge*, this seems to be a version of *Centipede*, albeit a good one.

Objectives

If you've spent the last year stuck in a compost heap, in *Centipede* you're based at the foot of the screen and must shoot the wriggling segmented creature as it descends. It zig-zags in a straightforward manner until diverted by a mushroom or other obstacle. Hit a body segment rather than its head and it splits into two new creatures.

First impressions

Visions appears to have caught the increasingly contagious disease (*Cassettium Garbagium*) in which you fill the cassette insert with this and that but forget to include instructions — rather important in this case as after you've selected the Kempston or keyboard option you're invited to 'select Speed 1-5.' Do that and you're straight into a game without knowing the control keys.

In play

The game itself is a good colourful version of the arcade classic, and that's more important than initial irritations. You

have three lives, with a bonus every 20,000 points, the H key will hold the game and there's the essential Hall of Fame at the end.

Your laser can move in eight directions using the joystick or, more awkwardly, two keys simultaneously on the keyboard, and it can patrol as far as about one quarter the way up the screen. Spiders bounce across the bottom in an unpredictable manner — sometimes staying for ages and then suddenly pouncing on you if you don't see them off.

From time to time a snail will crawl across the top, looking so like Brian from *The Magic Roundabout* that I found it hard to shoot it, and there are little bugs which descend leaving mushroom trails behind them, and which appear to be indestructible.

The five-speed options range from the extremely fast to the tediously slow, which should satisfy everyone, but the game could have done with more sound than incessant laser pings. Also, a rapid fire option would have saved a lot of wear and tear on the old digits.

Verdict

Versions of *Centipede* for the Spectrum are about as numerous as, well, legs on a centipede, and this one's as good as most if you get that uncontrollable urge to kill a creeper-crawler.

Mike Gerrard

RATING (/5)

Lasting appeal



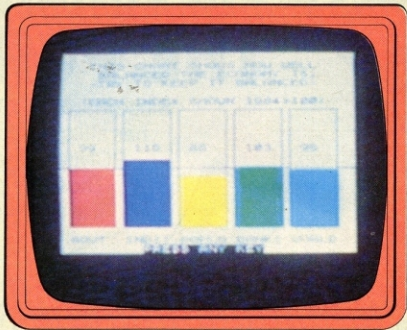
Playability



Use of machine



Overall value



Go into politics

Name 1984 **System** 48K Spectrum
Price £5.50 **Publisher** Incentive
 Software, 54 London Street,
 Reading RG1 4SQ **Format**
 Cassette **Language** Machine code
Other versions None **Outlet** Mail
 order/retail

This year being the pudding for proof of George Orwell's predictions, you really shouldn't be surprised to find a game called 1984. But forget about Big Brother watching you — in this one, you effectively get to be Big Brother.

Objectives

The game puts you in the hottest of hot seats — in charge of Great Britain's economy. As Prime Minister, you must control the web of factors that govern the economy. You've always said you could do better than the lot in office and now's your chance to prove it. Just ride out three terms in office — simple, eh?

In play

The game is basically a series of lists of information on the state of the economy. Most of your decisions are made by answering yes/no questions and selecting items from menus.

You always start with the 1982/83 figures. Each round represents one year in office, the completion of which is sounded by the chimes of Westminster.

Each year the balance sheet is presented together with the status of eight major indicators, such as inflation, unemployment and the trade balance.

The year-by-year progress of these may be called up as histograms — better not to look, they appear so much worse as rocketing or shrinking bars.

Oh, the Power! You can mangle the minimum lending rate, bash the banks, interfere with industry, desecrate departmental budgets, fork out the foreign aid and generally go bananas with the Budget.

Wage rounds are a little tricky — the three main sectors (civil service, public and private areas) all come pleading for hefty rises. Make a derisive offer and they end up getting all they wanted in the first place.

Five large coloured rectangles are displayed, each representing a major economic sector viz Government, Industry, Population, Banks, and the Rest of the World. It is your job to keep all these equally balanced, since instability heralds disaster.

A random factor is added in the shape of sudden and urgent Cabinet meetings. Finding that you need to pump funds into British Rail or that the pound has to be devalued can knock your clever calculations cocked.

Verdict

An absorbing economic game that offers all the fun and megalomaniac pleasure of running the country with none of the inevitable consequences. Would you make a better PM?

Bob Chappell

RATING (/5)

Lasting appeal



Playability



Use of machine



Overall value



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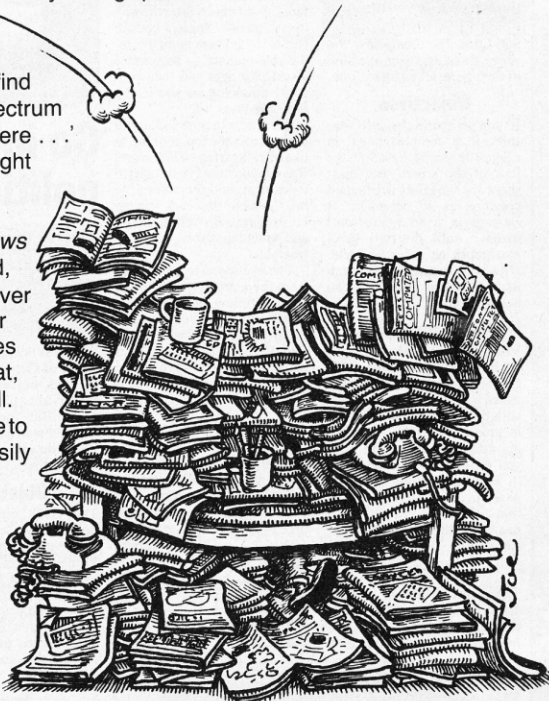
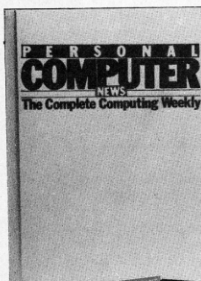
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ORIC 1

Death wishes

Name House of Death **System** Oric
Price £9.95 **Publisher** Tansoft
 (02205) 2261 **Format** Cassette
Language Basic **Other versions** None

Another encounter with death in your continuing quest for treasure when you play this latest adventure from the Tansoft stable.

Objectives

Five treasures are hidden around the House of Death. As you'd expect from its name, this place is no Home Sweet Home — it was once used as a set in such wonderful films as 'An American Werewolf In Guernsey' and 'Dracula Bytes'. If you find any treasures, they must be returned to the starting point. Scores are given as a percentage of how much of the game has been completed.

In play

As this is a text adventure (plus a few sound effects), the author has considerably made provision for you to specify the colour of your choice for the text. The background to the adventure is also offered.

The game gets off to a lively start when you find yourself outside the house. Ringing the bell produces a knocking sound while rapping with the brass knocker elicits a 'ding dong'. Before long, the finding of garlic, a werewolf mask and a mad axeman soon alert you, sensitive soul that you are, to

the fact that this is no ordinary house. A large ballroom and a trapdoor that isn't a trapdoor confirm your suspicions. Finding a witch stirring a cauldron in the kitchen clinches the matter — this is definitely not Coronation Street.

You start the adventure at 18.30 — a digital clock at the top of the screen keeps the time. It chimes on the hour. You can bet your boots that something particularly unpleasant is going to happen at midnight.

The vocabulary is reasonably comprehensive and abbreviations down to four letters are standard. Input is of the usual verb-noun type but single letters are acceptable (for directions and inventory, for example). A save and load feature is available and while the program is written in Basic, response times are quite satisfactory — two to three seconds on average. As Basic has been used, it's possible to list the program — of course, you spoil half the fun by doing so but it's nice to know you can peek if you really get stuck.

There are quite a few puzzles to test you and the program has a nice sense of humour.

Verdict

A traditional style of adventure with a pretty meaty content. Good puzzles and an interesting environment, so in you go.

Bob Chappell

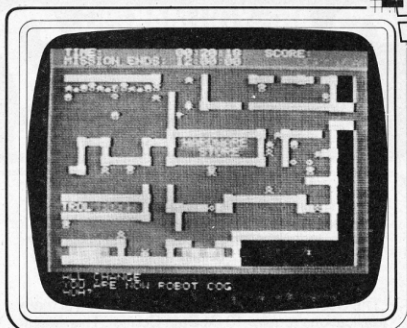
RATING (5)

Lasting appeal ⓂⓂⓂⓂ

Playability ⓂⓂⓂⓂⓂ

Use of machine ⓂⓂⓂⓂⓂ

Overall value ⓂⓂⓂⓂⓂ



Who is whom?

Name Operation Gremlin **System** Oric-1 **Price** £6.95 **Publisher** Wintersoft, 30 Uplands Park Road, Enfield, Middlesex **Format** Cassette
Language Machine code **Outlets** Mail order/Retail.

This program is a schizophrenic's dream — it gives you the chance to be eight different people which give it a nightmare quality that's original and appealing.

Objectives

The aim is to clear the space city Syron of gremlins and in so doing you encounter various problems like being hit by flying rockets, surrounded by aliens and trying to find out not just where they are — but who.

In play

There are nine levels of difficulty and the graphics capabilities of the Oric are used to the full. You're shown as a small character in the centre of the screen and as you move around, using the cursor keys, the maze-like city walls scroll around you.

The best starting strategy is to dodge round, making sure that each personality has a weapon. This way, your eight different characters can give the gremlins a really bad time.

To swap from one character to another you just press the relevant number. If that character is dead, you just have to move on.

You can get a status report on whichever character you happen to be, giving your name, status and so on. This is useful, as each character has to keep up

its strength by eating various bits of food left lying around the city.

Press P to pick up a weapon, but be warned. Some weapons make the gremlins multiply instead of killing them, so test with caution before use. You can't be greedy with weapons, either; you're only allowed to carry one at a time.

Commands are straightforward; E for eat, D drop and so on. From time to time you'll get warning messages telling you of malfunctions in various vital parts of the city.

You must try to find the relevant location and effect repairs before the situation gets out of hand.

While you're dealing with an alien, or trying to find some location, you may hear a tone. This tells you either that you're close to an alien, which you can see anyway, or it may mean that one of the other characters is under attack, in which case you have to rush from character to character, trying to discover who's threatened, then make them escape or destroy the aliens.

It's this aspect that really makes the game a cut above the rest.

Verdict

This program gets full marks from me for inventiveness, additive quality and use of sound and graphics.

It should give hours of fun to anyone with enough time to make the most of it.

Wendie Pearson

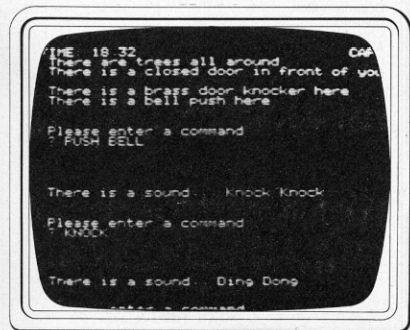
RATING (5)

Playability ⓂⓂⓂⓂⓂ

Use of machine ⓂⓂⓂⓂⓂ

Lasting appeal ⓂⓂⓂⓂⓂ

Overall value ⓂⓂⓂⓂⓂ



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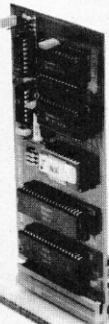
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TEXT & HIRES

A major problem for Dragon owners is the micro's inability to mix text with graphics, aside from using a machine code routine or a commercial program. This utility, from Anthony Jewell of Twyford, Berkshire, solves the problem using an addition to the ROM routine. It allows you to type directly onto the high-resolution screen, and use all the normal print commands from within a program. As an added bonus, it allows the whole character set to be redefined.

Type in the loader program: when run this will copy the ROM routine into RAM and modify it. The alterations make the computer remain in high-resolution mode and the machine code routine, read in by the rest of the loader, reads characters from memory (2862-31744) and prints them onto the high resolution screen.

The second program is a character definer; it must be used to define the new character set before the machine code is initialised. Once the characters have been defined, save the memory, including the print routine, to cassette with:

CSAVE "HTEXT",28671,32767,28671

Initialise the code with:

POKE360,126;POKE361,157;POKE359,126

Title: Text & Hires
Machine: Dragon 32
Language: Basic/Machine Code
Application: Utility
Author: A Jewell

LOADER NOTES

10-30 Copy the ROM routine into RAM.
 40 Data for alterations.
 50 POKE in the alterations.
 100 Start the loader loop.
 110 Read and POKE in the data.
 120 Add the data into P to produce a checksum.
 130 End loop.
 140 If the checksum is incorrect, then inform the user.
 155-360 Data for the machine code, to be poked onto the memory.

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Disable it with:

POKE359,57

To test the code, try PMODE4:SCREEN1,0. It should now be possible to type in high-resolution screen mode. In addition to the normal screen modes, there are a few more modes possible.

● PMODE1,3:SCREEN1,0;POKE&HFF22,255

● PMODE4,1:SCREEN1,0;POKE&HFF22,187;POKE&HB6,2

● POKE&HFF22,30

Try these and see what happens.

```

5 CLEAR 1000,&6FFF
10 FOR T=32413 TO 32667
20 POKE T,PEEK (T+14000)
30 NEXT T
40 DATA 32479,18,32480,18,32481,18,32483
,124,32484,64
50 FOR T=1 TO 5:READ A,B:POKE A,B:NEXT T
100 FOR T=31807 TO 32021
110 READ A#:POKE T,VAL ("&H"+A#)
120 P=P+PEEK (T)
130 NEXT T
140 IF P<>18700 THEN PRINT"DATA ERROR":E
ND
150 END
155 DATA 0C,B7
160 DATA 01,44,34,36,FC,00,88,83,04,00
170 DATA FD,01,38,54,54,54,54,54,F7,01
180 DATA 41,C6,08,3D,FB,01,41,F7,01,41
190 DATA FC,01,38,C4,1F,F7,01,40,86,FF
200 DATA B7,01,46,B6,01,44,81,08,26,06
210 DATA 7A,01,40,7F,01,46,C6,0C,3D,C3
220 DATA 70,00,1F,02,FC,01,40,8E,06,00
230 DATA 30,86,C1,00,27,07,30,89,01,80
240 DATA 5A,26,F9,C6,0C,A6,A0,34,04,D6
250 DATA B3,C1,03,26,01,43,35,04,34,04
260 DATA F6,FF,22,C1,1D,26,01,44,35,04
270 DATA A7,84,30,88,20,5A,26,DF,B6,01
280 DATA 44,81,0D,26,0A,7C,01,40,B6,01
290 DATA 40,81,20,25,A4,B6,01,46,81,00
300 DATA 26,03,7C,01,40,B6,01,40,81,1F
310 DATA 25,26,B6,01,41,81,0F,25,1F,8E
320 DATA 07,80,A6,84,A7,89,FE,80,30,01
330 DATA 8C,1E,00,25,F3,8E,1C,80,86,55
340 DATA D6,B3,3D,E7,80,8C,1E,00,25,F9
345 DATA 35,36,35,20,7E,80,0C,39,E7,80
350 DATA 8C,1E,00,25,F9,35,36,35,20,7E
360 DATA 80,0C,39,FF,00,FF,00,FF,00,FF

```

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CHARACTER DEFINER
NOTES

10 Set up the screen.
20 Dimension the character array.
30-80 Instructions.
90 Reset the screen and select the character to be defined (ASCII number).
100 Set the array to zero.
120 Print the character blocks to the screen.
130 Set up the auto repeat.
140 Print the numbers for the screen layout.
160-220 Scan the keyboard and take action depending on the keypress.
230-240 Update the cursor position on the screen and continue.
250 Set or reset a block.
260 POKE the character into the memory.
270-290 If the machine code is active display the characters on both low-resolution and high-resolution screens.

```

10 SCREEN0,0:CLS
20 DIMA(12,8)
30 PRINT"CHARACTER DEFINER:"
40 PRINT"USE ARROW KEYS TO MOVE CURSOR"
50 PRINT"[ENTER] TO SET"
60 PRINT"[CLEAR] TO RESET"
70 PRINT"SPACEBAR TO STORE CHARACTER"
80 PRINT@480,"PRESS A KEY";:IFINKEY#=""THEN 80
90 SCREEN0,0:CLS0:PRINT@448,"";:LINEINPU
T"CHARACTER?";C#:IFVAL(C#)<10 THEN C=ASC
(C#)ELSEC=VAL(C#)
100 FORI=1TO12:FORJ=1TO8:A(I,J)=0:NEXT:
NEXT
110 X=1:Y=1
120 FORI=1TO12:FORJ=1TO8:PRINT@J*32,CHR#
(128-79*(A(I,J)<>0));:NEXT:NEXT
130 P=X+Y*32+1024:PE=PEEK(P):PF=255:KE=A
B$(PEEK(&H87))* (PEEK(&HFF10)<>255)): 'AUTO
REPEAT FOR KEYS:REMOVE JOYSTICK BEFORE USE!
140 PRINT@1,"12345678";:PRINT@385+32,"12
345678";
150 POKEP,PF
160 IFKE=10 AND Y<>12 THENY=Y+1
170 IFKE=8ANDX<>1 THENX=X-1
180 IFKE=9ANDX<>8 THENX=X+1
190 IFKE=13 THENZ=1:GOTO250
200 IFKE=12 THENZ=0:GOTO250
210 IFKE=32 THENZ60
220 IFKE=ASC("^") ANDY<>1 THENY=Y-1
230 POKEP,PE:FORT=1TO10:NEXTT
240 GOTO130
250 A(Y,X)=Z:PRINT@X+Y*32,CHR$(128+79*Z)
;:GOTO130
260 FORI=1TO12:N=0:FORJ=1TO8:N=N+A(I,J)*
(2^(8-J));NEXT:POKE&H6FFF+C*12+I,N:NEXT
270 IFPEEK(359)=57 THEN GOTO90:' IS THIS
THE FIRST TIME OR NOT.
280 CLS:PCLS:COLOR1,0:FORT=1TO255:PRINTC
HR$(T);:NEXTT:SCREEN1,0:FORT=1TO2000:NEXTT
290 GOTO90

```

DEMO NOTES

10 Initialise the machine code.
20 Select screen.
30-60 Draw pattern.
70 Select colour.
80-120 Print onto the graphics screen.
130 Delay.
150 Print character set.
160 List the program.

```

10 POKE360,126:POKE361,157:POKE359,126:'
INITIALISE MACHINE CODE
20 PMODE4,1:SCREEN1,0:COLOR0,1:PCLS:' CHO
OSE NEW TEXT MODE
30 FORT=0 TO 192 STEP4:LINE(224-T,0)-(32
,T),PSET:LINE(224,192-T)-(224-T,0),PSET
40 LINE(32,T)-(T+32,192),PSET
50 LINE(T+32,192)-(224,192-T),PSET
60 NEXTT
70 COLOR1,0
80 PRINT@32+10,"Dragon Text";
90 PRINT@96+10,"and Graphics";
100 PRINT@160+3,"ABCDEFGHIJKLMNOPQRSTUVWXYZ";
110 PRINT@224+3,"abcdefghijklmnopqrstu
vwxyz"; ' INVERSE PRINTED AS LOWER CASE.
120 PRINT@480,"";
130 FORT=1TO1000:NEXTT
140 IFXX=0 THENXX=1:AUDIOOFF:POKE&HFF22,
30:SOUND1,1:PCLS:GOTO30:' CHOOSE YELLOW &
BROWN MODE. SOUND AND AUDIOOFF NECESSA
RY AFTER TAPE LOADING.
150 FORT=32 TO 128:PRINTCHR$(T);:NEXTT
160 LIST

```


SPLIT SCREEN SPLIT SCREEN SPLIT SCREEN

GRAPHICS

Title: *Split Screen Graphics*
 Machine: *Commodore 64*
 Language: *CBM Basic/6502 Machine code*
 Application: *Utility*

Many Commodore 64 owners may have heard or read about raster interrupts, and how useful they can be. The following listing from Andrew Dilley of Godalming in Surrey demonstrates the use of raster interrupts to obtain split screen graphics.

The value contained in the raster register is the number of the horizontal lines being drawn on the TV screen. The screen is divided up into horizontal lines with line numbers 50-250 on the screen window and the others on the border.

Suppose a program is written that tells the 64 to switch to bit map mode at one point and then back to normal at another. Only those lines drawn after the switch will be produced in the new mode; the rest will be unchanged.

To save the computer having to monitor the position of the raster all the time, interrupts are used. Normally these occur every 1/60th of a second and are used to update the Tl jiffy clock, flash, cursor, and so on.

However, two things allow the interrupts to be utilised. First, the address of the interrupt routine is held at memory location 788 and 789. By changing the values held here, it is possible to redirect the computer whenever an interrupt occurs.

Secondly, there is a register in the Vlc chip (53274) which allows the conditions under which the interrupt occurs to be selected. These can be light-pen interrupts, sprite collision interrupts and — yes, you guessed it — raster interrupts.

Once the computer has been told to provide raster interrupts, it needs to be told when. This is done by giving it a raster compare value. When the raster value matches the compare value, an interrupt is triggered. The compare value is stored in the same location in memory from which the actual raster position is read.

The demonstration program shows the split screen effect with bit mapped graphics. By changing the one memory location, the sixth item of data on line 640 from 20 to 40, the routine will give the split screen effect in extended colour mode.

The high-resolution screen is placed at 8192 and part of the 64's character set is copied into memory starting at 14336.

95	Clear the screen.		screen.
100	Gosub and load in the machine code.	200-240	Draw the SIN wave.
		250	Print message.
110	Gosub and move the character set.	260-290	Alter the compare value and thus alter the position of the split.
120	Gosub and clear the hi-res screen.	295	And keep on looping around.
130	Setup the character set.	300-380	Copy the characters from the ROM into RAM.
140	Setup the raster compare value.	400-440	Clear the hi-res screen.
150	Execute the machine code.	500-580	Load the machine code from lines 600-650.
160-170	Print title.	600-650	Data for the machine code.
190	Set up the colour of the hi-res		

```

95 PRINT "J"
100 GOSUB 500 :REM LOAD MACHINE-CODE
110 GOSUB 300 :REM CHARACTER SET
120 GOSUB 400 :REM CLEAR HI-RES
130 POKE 53272,(PEEK(53272)AND240)OR14:REM THIS GETS OUR
CHAR. SET
140 POKE 252,199:POKE 253,15
150 SYS 12*4096
160 PRINT "JAAAAAAAAAAAAAAAAAAAAAAAAA"
170 PRINT "MSPLIT-SCREEN GRAPHICS"
190 FOR I=1024 TO 1023+40*19:POKE I,16+6*NEXT
192 REM THIS SETS THE COLOUR OF THE HI-RES SCREEN
200 FOR X=0 TO 319
210 Y=INT(75+70*SIN(X/10))
220 B=320*(INT(Y/8))+8*(INT(X/8))+Y AND 7)
230 POKE 8192+B,PEEK(8192+B) OR 2*(7-(XAND 7))
240 NEXT
250 PRINT "J UNDER THIS 'SCREEN' YOU CAN SEE THE ":PRINT "
CHARACTER SET."
260 FOR T=1 TO 1000:NEXT
270 FOR I=200 TO 250:POKE 252,I:NEXT
280 FOR T=1 TO 1000:NEXT
290 FOR I=250 TO 200 STEP-1:POKE 252,I:NEXT
295 GOTO 260
300 PRINT "-COPYING CHARACTERS FROM ROM TO RAM"
310 POKE 56334,PEEK(56334)AND254
320 POKE 1,PEEK(1)AND251
330 FOR I=0 TO 64*8
340 : POKE I+14336,PEEK(I+13*4096)
350 NEXT
360 POKE 1,PEEK(1)OR4
370 POKE 56334,PEEK(56334)OR1
380 RETURN
400 PRINT "-CLEARING HI-RES SCREEN"
410 FOR I=8192 TO 8192+6144
411 REM DON'T CLEAR ENTIRE HI-RES SCREEN, SO AS TO LEAVE
ROOM FOR CHAR. SET
420 : POKE I,0
430 NEXT
440 RETURN
500 PRINT "-LOADING MACHINE-CODE"
510 S=12*4096
520 I=0
530 READ H$
540 IF H$="*" THEN RETURN
550 H=ASC(H$)-48:L=ASC(RIGHT$(H$,1))-48
560 H=H+7*(H>9):L=L+7*(L>9)
570 POKE S+I,16*H+L
580 I=I+1:GOTO530
600 DATA 78,A9,19,00,C0,0D,14,03,0C,15,03
620 DATA AD,1A,D0,09,01,8D,1A,D0,A9,00,85,FB,58,60
630 DATA AD,19,D0,29,01,D0,03,4C,31,EA,8D,19,D0
640 DATA 78,AD,11,D0,49,20,29,7F,0D,11,D0,A6,FB,00,02,D0,02,
A2,00
650 DATA B5,FC,0D,12,D0,E8,06,FB,58,68,AB,68,68,40,*

```

ARRAY SORT UTILITY

10-190	Check and load the machine code. NB the code is relocatable and 16K Spectrum owners can alter line 180 appropriately. Once the code is in memory, it can be saved using SAVE "sort" CODE 65000,289	305	Uses a function to save repeating PEEK (X) +256*PEEK(X+1)	350	This address needs to be altered if the start address is not 65000.
200-280	Example for a Basic bubble sort.	320-340	Show the information included when running the machine code sort. Note that the printer buffer is used to store essential information and so must be renewed every time the routine is used.	360-380 385	Error detection lines: This shows the number of passes required to sort the data and is not essential for running the program. Produces a random array as an example. Produces the printout of the sorted array.

A number of database programs have been listed in the various magazines lately. Unfortunately, they often suffer from lack of a good fast sort routine. J G Williams of Malvern, Worcestershire has solved the problem by producing a machine code sort routine for the Spectrum.

The program works by checking through the variable area to find the string array to be sorted. Once located, the number of elements is retrieved and any offset is added as required. The strings are then sorted using the normal bubble sort. Control is returned to Basic at the end of the sort. Temporary data, for moving, is stored in the spare memory between the end of the calculator stack and the end of the machine code stack and the printer buffer is used as scratchpad area.

The offset refers to the number of characters from the beginning of each string of the array at which the comparison is to begin. An offset of 1 starts the comparison with the second letter of the string, 2 will start at the third etc.

Note that the program needs to know how many to sort or null strings would be sorted to the beginning of the array. The program shows a comparison between the Basic sort and the machine code sort. Extracting the machine code sort from the program for use elsewhere should be fairly easy.

Title: Array Sort Utility
Machine: Spectrum
Language: Machine code
Application: Sort routine
Author: J G Williams

```

1 REM *****
2 REM *
3 REM * ARRAY SORT UTILITY *
4 REM * (M/C) FOR SPECTRUM *
5 REM * J.G.WILLIAMS.4/84 *
6 REM *
7 REM *****
8 IF PEEK 65000=33 THEN GO TO
200
10 DATA 33,5,91,6,17,54,0,35,1
6,251,58,0,91,42,89,92,237,75
20 DATA 75,92,197,237,66,229,1
93,225,237,177,192,35,35,126,50
30 DATA 9,91,35,78,35,78,35,23
5,42,3,91,3,237,66,235,208,237
40 DATA 75,3,91,237,67,5,91,78
35,78,35,34,16,91,237,67,7,91
50 DATA 58,9,91,61,259,1,40,27
50,9,91,94,35,86,27,35,229,42,7
60 DATA 91,9,27,62,0,187,32,24
9,186,32,246,229,193,225,24,214
70 DATA 235,42,101,92,9,237,11
4,208,42,1,91,11,237,66,235,208
80 DATA 237,91,5,91,27,62,0,18
7,32,3,186,40,124,237,83,5,91,34
90 DATA 10,91,237,75,7,91,9,34
14,91,42,10,91,237,91,1,91,25,3
4,12,91,126,9,190
100 DATA 40,7,48,50,42,14,91,24
205,42,7,91,237,82,235,42,12,91
110 DATA 34,19,91,27,62,0,187,3
2,8,186,32,5,42,14,91,24,62,42
120 DATA 19,91,35,34,19,91,126,
9,190,40,230,48,5,42,14,91,24
130 DATA 160,237,75,7,91,42,10,
91,237,91,101,92,237,176,237,91
140 DATA 10,91,237,75,7,91,237,
176,213,42,101,92,237,75,7,91
150 DATA 237,176,225,62,1,50,18
,91,24,213,58,18,91,254,0,200
160 DATA 237,91,5,91,237,83,5,9
1,237,91,21,91,19,237,83,21,91,6
2,0,58,18,91,42,16,91,24,180
170 CLEAR 64999: LET a=0: LET c
hecksum=0
180 CLS : PRINT AT 10,10:"LOADI
NG CODE": FOR y=65000 TO 65288:
READ a: POKE y,a: LET checksum=a
+checksum: NEXT y
190 IF checksum<>26144 THEN PRI
NT "CHECK DATA ": STOP
198 REM
199 REM ***** BASIC SORT *****
200 CLS : PRINT AT 10,10:"EXAMP
LE SORT"
205 LET elements=18: DIM a$(ele
ments,10)
210 LET offset=0: INPUT ("Enter
Offset -> ");offset
220 CLS : PRINT AT 9,11: FLASH
1:"BASIC SORT"
230 GO SUB 400
240 PRINT AT 9,22: FLASH 1:"SOR
TING"
250 LET flag=0: FOR y=1 TO 17:
IF a$(y,offset+1 TO 10)>a$(y+1,o
ffset+1 TO 10) THEN LET t=a$(y)
: LET a$(y)=a$(y+1): LET a$(y+1)
=t$: LET flag=1
260 NEXT Y
270 IF flag=1 THEN GO TO 250
280 GO SUB 500
298 REM
299 REM ***** M/C SORT *****
300 CLS : PRINT AT 9,11: FLASH
11:"M/C SORT"
305 DEF FN a(x)=PEEK x+256*PEEK
(x+1)
310 GO SUB 400
320 POKE 23296,128+CODE "A"
330 POKE 23297,offset-INT (offs
et/256): POKE 23298,INT (offset/
256): REM OFFSET
340 POKE 23299,elements-INT (el
ements/256): POKE 23300,INT (el
ements/256): REM ELEMENTS
350 RANDOMIZE USR 65000
360 IF PEEK 23305=0 THEN PRINT
"ARRAY NOT FOUND": STOP
370 IF FN a (23301)=0 THEN PRINT
"INCORRECT No. OF ELEMENTS CHOS
EN": STOP
380 IF FN a (23306)=0 THEN PRINT
"WRONG OFFSET OR INSUFFICIENT S
PACE TO SORT": STOP
385 PRINT TAB 5: INVERSE 1:"No.
OF PASSES =":FN a (23317)
390 GO SUB 500: RUN
398 REM
399 REM *** UNSORTED ARRAY ***
400 PRINT AT 0,0:"UNSORTED ARR
AY"
410 FOR y=1 TO 18: FOR z=1 TO 1
0
420 LET a$(y,z)=CHR$(65+INT (R
ND*26)): NEXT z: PRINT a$(y): NE
XT Y: RETURN
498 REM
499 REM ***** SORTED ARRAY *****
500 PRINT AT 0,19:"SORTED ARR
AY": FOR y=1 TO 18: PRINT AT Y,21:
a$(y): NEXT Y: PRINT AT 21,3:"PR
ESS ANY KEY TO CONTINUE": PAUSE
0: RETURN

```

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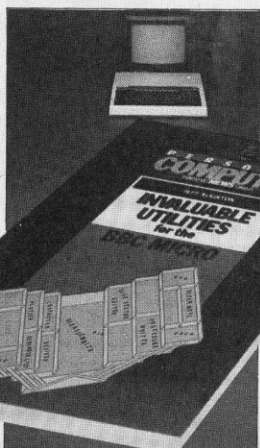
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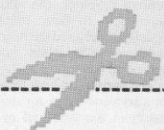
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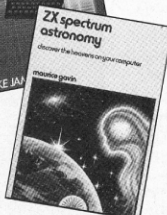
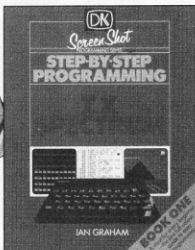
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Creating Adventure Programs on the ZX Spectrum' by Peter Shaw and James Mortleman, published by Interface at £4.95 (paperback, 124 pages)
'Spectrum Magic' by Steve Betts, published by W Foulsham & Co at £5.50 (paperback, 95 pages)
'Step by Step Programming — ZX Spectrum' volumes 1 and 2 by Ian Graham, published by Dorling Kindersley at £5.95 each (paperback, 64 pages each)
'An Expert Guide to the Spectrum' by Mike James, published by Granada at £6.95 (paperback, 190 pages)
'ZX Spectrum Astronomy' by Maurice Gavin, published by Sunshine Publications at £6.95 (paperback, 229 pages).



Hardly a week goes by without 'another great book from Interface Publications' (© Interface Publications) whacking onto the doormat in the entrance hall of PCN towers. 'Creating Adventure Programs on the ZX Spectrum', by Peter Shaw and James Mortleman, is one of the latest from this stable, and follows Interface's traditional format by having plenty of listings for you to hack in.

There are seven complete adventures including 'Elsie the Aadvark (sic, throughout) goes Lunar Surveying.' There are a number of howlers along these lines, including 'Minataurs, Hydra and the Scylla make excellent monsters.' PCN's culture correspondent reveals that Scylla was actually a rock, and while this may be a handy way of dealing with those failed user-defined graphics, the authors here seem to have unintentionally underlined the need for good research when you're writing an adventure.

The section on how to write an adventure takes up slightly less than the first half of the book, but there's enough information to show you the techniques to use in programming an adventure. The problem is that the techniques aren't really all that different to those you'd use in other programs.

Work out how you store your locations in arrays and how to give the game a vocabulary, then you just zip through PLOT and DRAW and that's that. The only other things you'd need to know would be a little on organising long Basic programs, how to write a script, and how to produce fast com-

plex graphic displays. None of these are covered in any detail. Still, seven adventures for £4.95 can't be bad.

'Spectrum Magic'—your first programming book' is a different kettle of fish. Aimed at children from nine upwards, it sports a jolly cover that looks a bit like Gerald Scarfe's impression of Ronald Reagan leading the invasion of Grenada.

It starts with the usual 'setting it up' chapter, plus a short homily on the subject of 'butter spoils the works' which indeed it does. The author takes a gently, gently, approach throughout — too gently I'd have thought, as by the time a beginner's reached the end of the book they'll have learned only very basic programming techniques.

This makes chapter 31 'Speeding ahead', look a bit bizarre. It presents a sketchily explained piece of machine

'The Spectrum Workshop—word processing and beyond' by Randle Hurley, published by McGraw-Hill Book company at £6.95 (paperback, 142 pages).

This is a little cracker if you want to use your machine for something more useful than saving the universe from hordes of aliens or trekking on an adventure.

In 11 chapters you learn to use word processing programs which build up into modules that can each be used as components for other projects.

Author Randle Hurley gives listings for the programs and breaks the lines into chunks to explain them fully. The pro-

grams are designed for use by newcomers and each is supported by some useful operat-

code, plus its Basic equivalent, to illustrate the difference in speed. Readers that reach chapter 30 thinking they've learned a bit about programming are liable to change their minds when they hit 31.

'Step by Step Programming for the ZX Spectrum', by Ian Graham, comes in two volumes, and is again educational. Both volumes are beautifully presented, and use a screen-shot technique to pro-

duce the program listings. The ground covered in Book one is similar to that dealt with by 'Spectrum Magic', but it's a little wordier and the explanations are clearer.

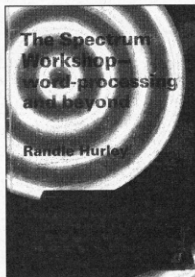
Book two follows the same format, but this turns into a disadvantage because program length is limited to one screenful. Also the information included seems a lot less systematic than in the first volume.

Mike James' 'An Expert Guide to the Spectrum' turns out to be an interesting book, although its usefulness is limited by an inadequate index. Mr James concentrates on what is going on inside the machine when a program is running, so when you've finished reading it you'll probably have a better understanding of what the Spectrum does, and why it does it.

Spectrum Basic is covered, along with the tape system, Microdrives, communications and advanced programming applications, and the book includes enough in the way of machine code routines to whet the beginner's appetite.

And finally, what can a non-astronomer say about a book about astronomy? 'ZX Spectrum Astronomy', by Maurice Gavin, isn't aimed at astronomers, but rather at Spectrum owners 'who wish to expand their computing interests into other fields.' It includes routines to allow you to simulate the movement of the stars and to produce star maps, but I think you'd have to have some prior interest in the field for the book to grab and hold your attention.

JK



ing instructions and advice.

For the more experienced user there is enough documentation to allow modification of software. Programs included are Spectro, a basic word processor; and the more advanced Spectext; Specfile, a filing system; and Specmerge, which takes the output of the word processor and merges two files.

There are suggestions for how to use these programs, a section on attaching a printer and an appendix of the machine code memory map.

As a good reference work on word processing, this book is very suitable.

SG

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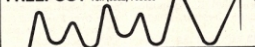
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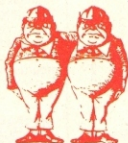
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Games — Our reviews concentrate on the Spectrum and Commodore 64. Programs — Help yourself to listings for the Oric machines.

Feeding up

Apple Computer has designated June 4 to 9 as Macintosh Week. Planned events include such exciting venues as Liverpool Street station, familiar to Monopoly players the length and breadth of the country. We think Apple might try to interest British Rail's catering department in taking on a consignment of fresh fruit.

Laughlines at the wicket



As one Laughline contest closes another opens. All you need to do is put words into mouths and make us laugh. We won't give you any prompting in the new competition, and the gentleman pictured above should need no introduction. Don't feel inhibited — there are no sensitive Yorkshiremen on the staff.

And thanks for your captions to the Acornsoft Arrest in the Agent Provocateur shock picture.

Comiserations to runners-up like Antony-Smith of Huddersfield ('You see, officer, we're on a demonstration about not being awarded the cheese mark'), and congratulations to the winner this time round, R Hughes of Dagenham: 'I don't care what Prestel says, I'm telling you it's snowing.' Mr Hughes wins £20, which is again the size of the prize for Sir Geoffrey's words. No vulgarity, please.

The result will be published in Issue 65 — that's three weeks away.



SANTAX ERRORS

Paging Mr C Mungall, a prize winner from some weeks ago. We have your cheque but we've mislaid your address — please contact us on 01-636 6890.

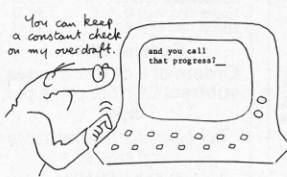
Also in the phone numbers department, our Back Issues spread in issue 61 invited you to call the Back Issues Department for details. But we gave no phone number. The shy, retiring people in the Back Issues Department are on 01-439 4242.

In issue 61 What's New, software-writer, Serin Software's phone number is Farnham Common 3180. Check to see what the STD dialing code for Farnham Common is for your area — it varies throughout the country.

NCR reigns in



In view of the success and popularity of Red Rum, NCR should probably have called its racehorse Rum Do. But no, there you see the poor creature's name on its jacket.



PCN DATALINES

PCN Datalines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in

PCN Datalines should send the information at least one month before the event. Write to PCN Datalines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
RIBA Computer Exhibition	May 22-24	Bloomsbury Grest Hotel, Coram Street, London WC1	RIBA Services 01-637 8991
Apple '84	May 24-26	Fulcrum Centre, Slough	Database Publications 061-456 8388
Software '84	June 5-7	Earls Court, London SW5	Reed Exhibitions 01-643 8040
Office Automation Show	June 5-7	London Barbican	Cahners Exhibitions 01-891 5051
Offshore Computer Conference and Exhibition	June 5/7	Skean Dhu Hotel, Aberdeen	Offshore Conferences & Exhibitions 01-734 4343
5th International Commodore Show	June 7-9	Novotel Hotel, London W6	Granard Communications 01-930 6711
IBM User Show	June 12-14	Wembley Complex	Online Conferences 01-868 4466
Computer Fair	June 14-17	Earls Court	Reed Exhibitions, 01-643 8040
Compec North	June 19-21	Belle Vue, Manchester	Reed Exhibitions 01-643 8040
National Conference and Exhibition on Computers in Personnel	June 26-28	Royal Lancaster Hotel, London	Peter Mirington Exhibitions (0277) 232030

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Micro Exposition	May 22-26	Paris	J Watts Marketing LD 0344 88648
International Computer Show for Office, Home, Hobby	June 14-17	Cologne, Germany	German Chamber of Industry and Commerce 01-930 7251

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